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"Catalogue of Fresh-water Fishes of  
Africa," Vol. III., printed on special  
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9 Fishes

DIVISION OF FISHES

# CATALOGUE

OF THE

## FRESH-WATER FISHES OF AFRICA

IN THE

BRITISH MUSEUM

(NATURAL HISTORY).

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VOLUME III.

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BY

GEORGE ALBERT BOULENGER, F.R.S.

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LONDON:

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THE MIDLAND EDUCATIONAL Co., Ltd., 41 & 43 CORPORATION STREET, BIRMINGHAM;

AND AT THE

BRITISH MUSEUM (NATURAL HISTORY), CROMWELL ROAD, S.W.7.

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# CATALOGUE

OF THE

## FRESHWATER FISHES OF AFRICA

IN TWO VOLUMES.

BRITISH MUSEUM

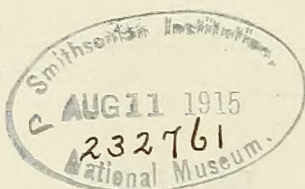
NATURAL HISTORY

ALERE FLAMMAM.



PRINTED BY TAYLOR AND FRANCIS,

RED LION COURT, FLEET STREET.





## PREFACE.

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IN marked contrast with its predecessor, Volume III. of the present Catalogue includes a considerable number of Families, belonging to the Suborders Symbranchii, Apodes, Haplomi, Scombresoces, Lophobranchii, and Acanthopterygii. Most of these groups are but slightly represented in the African Fresh-water Fauna. The Scombresoces, however, include the Family Cyprinodontidæ, and therefore comprise a considerable number of African species. The account of the Acanthopterygii begins with a few Families which do not require much space for their treatment, and then proceeds to the description of the Cichlidæ, the importance of which in the area considered is indicated by the fact that this Family occupies nearly three quarters of the Volume.

The rapid growth of our knowledge of the subject has been mainly responsible for the increase in length of this Catalogue beyond the limits originally intended. As explained by the author in his Introduction, several Families of Fishes are held over for a fourth Volume, which will also contain *addenda* and a general Index, and is expected to complete the work.

The services rendered by donors and others have been as important in making the preparation of the present Volume possible as in connexion with its predecessors, and equally deserve cordial recognition.

SIDNEY F. HARMER,  
*Keeper of Zoology.*

BRITISH MUSEUM (NATURAL HISTORY),  
LONDON.

March, 1915.







## INTRODUCTION.

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As originally planned, this Catalogue was to have been completed in three volumes; but the additions whilst its preparation was in progress have been so numerous that the last families of Acanthopterygii together with the small Suborders Opisthomi and Plectognathi, must stand over for a fourth volume, which will also include addenda to the other parts and an amalgamated alphabetical index to the whole work.

This volume contains descriptions of 394 species and the enumeration of 4428 specimens. Of these 394 species, only 45 are unrepresented in the Collection.

The bulk of the volume is taken up by the Perciform Fishes of the family Cichlidæ, our knowledge of which has been so enormously increased within the past quarter of a century. Of the 285 African species regarded as well established, 221 have been described since 1890, viz., 93 between 1891 and 1900, 81 between 1901 and 1910, and 47 between 1911 and 1914.

G. A. BOULENGER.

ZOOLOGICAL DEPARTMENT,  
BRITISH MUSEUM,  
27th February, 1915.





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# CATALOGUE

OF

## AFRICAN FRESH-WATER FISHES.

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### Suborder III. SYMBRANCHII.

Eel-shaped Fishes without paired fins, with the pectoral arch free or suspended from the skull, and with the anterior vertebræ distinct, without Weberian ossicles. Præmaxillary and maxillary well developed. Gill-openings confluent into a single ventral slit. Air-bladder absent.

#### Fam. 1. SYMBRANCHIDÆ.

Maxillary behind the præmaxillary, forming but a small part of the oral border; parietal bones forming a long sagittal suture. Post-temporal well developed, forked, attached to the skull. Præcaudal vertebræ with very strong parapophyses, to which short slender ribs are attached. Skin naked. Vertical fins rudimentary.

Fresh and brackish waters of the Tropics. A single representative in Africa.

#### 1. SYMBRANCHUS.

Bloch, *Ausl. Fische*, ix. p. 86 (1795); Günth. *Cat. Fish.* viii. p. 15 (1870).

*Unibranchapertura*, Lacep. *Hist. Poiss.* v. p. 656 (1803).

*Ophisternon*, McClell. *Calc. Journ. N. H.* v. 1845, p. 196.

*Tetrabanchus*, Bleek. *Nat. Tijdschr. Nederl. Ind.* ii. 1851, p. 69.

Four branchial arches with well-developed gills. Gill-membrane free from the isthmus. Teeth on the palate forming a band. Vertebræ over 100.

South-Eastern Asia, Tropical America, Australia, and Tasmania. One species in West Africa.

## 1. SYMBRANCHUS AFER.

Bouleng. Ann. & Mag. N. H. (8) iv. 1909, p. 430.

Snout rounded, about twice length of eye and a little exceeding interorbital width; distance between end of snout and gill-opening  $1\frac{1}{2}$  times length of skull, 8 times length of snout, and contained  $7\frac{2}{3}$  times in distance from snout to vent; length of tail about  $3\frac{1}{2}$  times in total

Fig. 1.



*Symbranchus afer.*  
Type.

length. Gill-opening rather wide. Tail ending in a rather obtuse point. 126 vertebræ. Coloration uniform blackish, or anterior part of body black and red.

Total length 320 mm.

Portuguese Guinea and Lower Niger\*.

1-2. Types.	Tidal river at Port Mansoa, Portuguese	Dr. W. J. Ansorge (C.).
	Guinea.	
3. Skel.	"	"
	"	"

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\* Almost simultaneously with the publication of this species, Captain Vipan received a specimen, stated to be from the mouths of the Niger, which at the time of writing was still living in his fresh-water aquarium at Stibbington Hall.



Suborder IV. A P O D E S.

Air-bladder, if present, communicating with the digestive tract by a duct. Præmaxillaries absent. Pectoral arch, if present, not connected with and remote from the skull; mesocoracoid arch absent. Fins without spines, the ventrals absent. Anterior vertebræ distinct, without Weberian ossicles.

Fam. 1. ANGUILLIDÆ.

Maxillaries present, separated on the median line by the ethmo-vomer; palato-pterygoid bone present, connected with the hyomandibular and quadrate; gill-clefts separate, opening into the pharynx by wide slits. Præsacral vertebræ with very strong parapophyses, to which short slender ribs are attached. Vent far removed from the head. Scales minute or absent. Vertebræ over 100.

Seas of temperate and tropical zones, a few forms entering fresh waters.

Two genera are represented in African fresh-waters:—

Minute scales \* imbedded in the skin; nostrils

superior; end of tail surrounded by the fin;

pectoral fins present . . . . . 1. *Anguilla*, Shaw, p. 3.

No scales; nostrils labial; end of tail free; no

pectoral fins . . . . . 2. *Sphagebranchus*, Kaup, p. 10.

1. ANGUILLA.

Shaw, Gen. Zool. iv. p. 15 (1804); Günth. Cat. Fish. viii. p. 23 (1870); Bouleng. Fish. Nile, p. 401 (1907).

Body much elongate, serpentiform, with minute scales imbedded in the skin, arranged in small groups placed obliquely at right angles to one another. Pectoral fins well developed; dorsal and anal fins very long, united at the end of the tail, the former originating at a great distance from the occiput. Mouth large, with more or less developed lips; jaws and palate with bands of small pointed teeth; nostrils widely separated from each other, the anterior tubular and at the tip of the snout, the posterior slit-like and close to the eye. Gill-openings small, crescentic, close to the base of the pectoral fins.

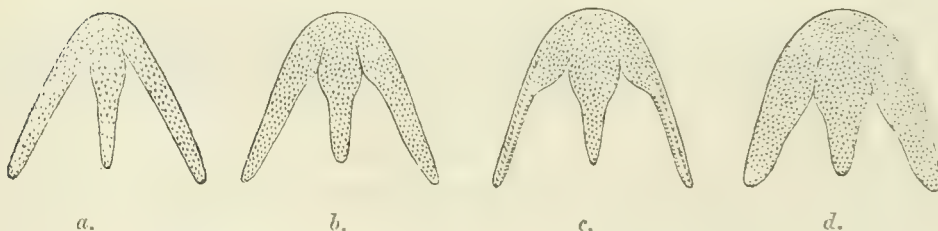
\* Absent in the very young.

Breed in the deep sea, where they undergo very marked metamorphoses (larval forms known as *Leptocephalus*). In Africa, confined to the rivers flowing into the Mediterranean and the North Atlantic and Indian Oceans.

*Synopsis of the Species.*

- I. Dorsal originating well in advance of vent.  
 Mouth not extending beyond eye, or, rarely, extending beyond ; teeth on sides of jaws in 2 (young) to 4 series, not separated by a longitudinal groove or interspace . . . . . 1. *A. vulgaris*, Turt., p. 4.  
 Mouth extending beyond eye ; teeth on sides of jaws in 3 (young) to 6 series, not separated by a groove or interspace . . . . . 2. *A. mossambica*, Peters, [p. 6.  
 Mouth extending to below posterior border of eye, or beyond ; teeth on sides of jaws in 2 series, separated by a longitudinal groove or interspace (young), or in a single or double series with an inner detached series of minute, sometimes very indistinct teeth . . . . . 3. *A. bengalensis*, Gray, [p. 7.  
 II. Dorsal originating above or slightly in advance of vent ; teeth on sides of jaws in 4 (young) to 10 series . . . . . 4. *A. australis*, Rich., p. 9.

Fig. 2.



Dentition of upper jaw and palate in adult specimens of :  
 a. *A. vulgaris* ; b. *A. mossambica* ; c. *A. bengalensis* ; d. *A. australis*.  
 The bands of teeth are narrower in young specimens.

1. *ANGUILLA VULGARIS* \*.

*Muræna anguilla*, Linn. Syst. Nat. i. p. 426 (1766).

*Anguilla vulgaris*, Turton, Brit. Faun. p. 87 (1807) ; Günth. Petherick's Trav. ii. p. 266 (1869), and Cat. Fish. viii. p. 29 (1870) ; Playf. & Letourn. Ann. & Mag. N. H. (4) viii. 1871, p. 393 ; Bouleng. Fish. Nile. p. 402, fig. (1907).

\* For this and the other species of the genus, only the names applied to African specimens or having a direct bearing on their nomenclature are quoted, and the list of specimens is restricted to those of African origin.



*Anguilla acutirostris*, Risso, Hist. Nat. Eur. MÉR. iii. p. 198 (1826); Rüpp. N. Nachtr. Fische Nil, p. 26 (1835).

*Anguilla latirostris*, Risso, op. cit. p. 199; Günth. l. c. and Cat. p. 32.

Taban, Rifaud, Voy. Egypte, pls. xviii. & xcii. (1830).

*Anguilla canariensis*, Val. in Webb & Berthel. Iles Canar., Poiss. p. 88, pl. xx. fig. 1 (1843); Kaup, Cat. Apod. Fish. p. 41, pl. v. fig. 29 (1856).

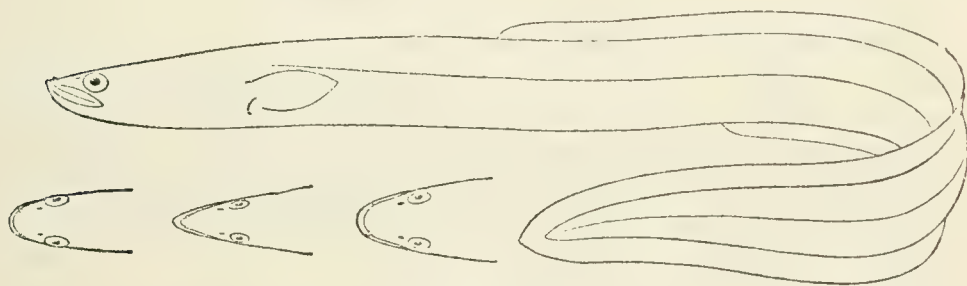
*Anguilla nilotica*, Heck., Russegger's Reise Egypt. iii. p. 313 (1849); Kaup, op. cit. p. 40, fig. 28.

*Anguilla callensis*, Guichen. Explor. Sc. Alg., Poiss. p. 111, pl. vii. fig. 1 (1850); Kaup, op. cit. p. 41.

*Anguilla egyptiaca*, Kaup, op. cit. p. 40.

Vomerine patch of teeth tapering to a narrow band or point; maxillary and mandibular teeth tapering on the sides to a rather narrow band (2 to 4 series). Mouth extending to below centre or posterior border of eye, rarely slightly beyond; lower jaw projecting. Distance from end of snout to gill-opening  $2\frac{1}{2}$  to  $3\frac{1}{2}$  times in distance from end of snout to vent. Tail longer than body. Origin of dorsal much in advance

Fig. 3.



*Anguilla vulgaris*.

From Egypt (F. N.).  $\frac{1}{3}$ .

Showing variation in shape of head and proportion of eye.

of vent, midway between pectoral and vent, or nearer latter. Pectoral  $2\frac{1}{5}$  to  $3\frac{1}{4}$  times in its distance from end of snout. Olive-brown to dark green above, yellow or silvery on the sides; lower parts white. Vertebrae 111–118 (usually 113–117).

Total length over 1 metre.

Northern Atlantic and Mediterranean; entering rivers of North Africa (Nile up to second cataract), Madeira, and the Canary Islands.

- |        |                               |                          |
|--------|-------------------------------|--------------------------|
| 1. Ad. | Mediterranean coast of Egypt. | J. Petherick, Esq. (C.). |
| 2. Ad. | L. Borollos, Egypt.           | L. Loat, Esq. (C.).      |

3-6. Ad. & hgr.	L. Menzaleh, Egypt.	L. Loat, Esq. (C.).
7. Skel.	" "	"
8-17, 18-32. Hgr.	Near Ghet-el-Nassara,	"
& yg.	L. Menzaleh.	
33-42. Ad. & hgr.	Lower Nile.	J. Petherick, Esq. (C.).
43. Ad.	"	N. R. Harrington, Esq., and Dr. Hunt (E.).
44. Ad.	I. of Warak, near Cairo.	L. Loat, Esq. (C.).
45-50. Ad., hgr., & yg.	Near Cairo.	"
51-54. Ad. & hgr.	Beni Souef.	"
55. Ad.	Birket Karun, Fayum.	Dr. W. A. Cunningham and Dr. C. L. Boulenger (P.).
56. Ad.	Assuan.	L. Loat, Esq. (C.).
57. Hgr.	Korosko, Nubia.	"
58-60. Ad.	Algiers.	Sir L. Playfair (P.).
61-62. Hgr.	Oum Erbiah, Morocco.	Mr. F. W. Ruggenbach (C.).
63. Yg.	Madeira.	Rev. R. T. Lowe (P.).

## 2. ANGUILLA MOSSAMBICA.

- Tribranchus anguillaris*, Peters, in J. Müll. Abh. Ak. Berl. 1844, p. 193 \*.
- Muræna (Anguilla) mossambica*, Peters, Mon. Berl. Ac. 1852, p. 684.
- Anguilla celebesensis*, Kaup, Cat. Ap. Fish. p. 42 (1856); M. Weber, Zool. Jahrb.,  
Suppl. xv. i. 1912, p. 585, figs.
- Anguilla delalandii*, Kaup, op. cit. p. 50, pl. viii. fig. 41; Günth. Cat. Fish. viii.  
p. 33 (1870); Sauv. Hist. Madag., Poiss. p. 498, pl. l. fig. 6 (1891).
- Anguilla capensis*, Kaup, Abh. Nat. Ver. Hamb. iv. 2, 1859, p. 18, pl. ii. fig. 2;  
Casteln. Mém. Poiss. Afr. Austr. p. 73 (1861).
- Anguilla labiata*, part., Playf. & Günth. Fish. Zanzib. p. 124, fig. (1866).
- Anguilla mossambica*, Peters, Reise Mossamb. iv. p. 98, pl. xviii. fig. 1 (1868);  
Günth. t. c. p. 28; M. Weber, t. c. p. 590.
- Anguilla ancitensis*, Günth. t. c. p. 34.
- Anguilla virescens*, part., Günth. t. c. p. 35.

Teeth forming moderately broad bands, in 3 to 6 series on each side. Mouth extending beyond posterior border of eye; lower jaw strongly projecting. Distance from end of snout to gill-opening  $2\frac{2}{3}$  to  $3\frac{1}{2}$  times in distance from end of snout to vent. Tail longer than body. Origin of dorsal much in advance of vent, midway between pectoral and vent, or nearer latter. Pectoral  $2\frac{1}{2}$  to  $3\frac{1}{2}$  times in its distance from

\* No definition of the species.

end of snout. Olive or dark green above, yellowish or white beneath. Vertebrae 104.

Total length 800 millim.

Indian and South Pacific Oceans; entering rivers of East and South Africa.—Type in Berlin Museum.

Fig. 4.



*Anguilla mossambica.*

Type, after Peters (Reise Mossamb.).  $\frac{1}{2}$ .

1-2. Hgr.	Zanzibar.	Sir J. Kirk (C.).
3. Ad.	Seychelles.	Prof. E. P. Wright (P.).
4. Ad.	Groot Olifants R., Transvaal.	Major G. E. Bruce (P.).
5. Hgr.	Umfulosi, Zululand.	Mr. C. Grant (C.); C. D. Rudd, Esq. (P.).
6. Hgr.	Dorp Spruit, near Pietermaritzburg.	Dr. E. Warren (P.).
7. Ad.	Durban.	
8. Skel.	„	
9-10. Hgr.	Buffalo R., King Williamstown.	Major H. Trevelyan (P.).
11-13. Yg.	Near Grahamstown.	Rev. G. H. R. Fisk (P.).
14. Ad. stuffed.	Cape Colony.	Sir A. Smith (P.).

### 3. ANGUILLA BENGALENSIS.

*Muraena bengalensis*, Gray, in Hardwicke, Ill. Ind. Zool. pl. —. fig. 5 (1830).

*Anguilla mauritiana*, Bennett, Proc. Comm. Zool. Soc. 1831, p. 128; Günth. Cat. Fish. viii. p. 25 (1870), and Fische Südsee, p. 389 (1910); M. Weber, Zool. Jahrb., Suppl. xv. i. 1912, p. 582, fig.

*Anguilla elphinstonei*, Sykes, Tr. Zool. Soc. ii. 1841, p. 337; W. Weber, t. c. p. 578.

*Muraena (Anguilla) labiata*, Peters, Mon. Berl. Ac. 1852, p. 684.

*Muraena (Anguilla) macrophthalma*, Peters, l. c.

*Anguilla johannæ*, Playf. & Günth. Fish. Zanzib. p. 124, fig. (1866).

*Anguilla labiata*, part., Playf. & Günth. l. c.

*Anguilla labiata*, Peters, Reise Mossamb. iv. p. 94, pl. xvii. (1868); Günth. Cat. Fish. viii. p. 26 (1870); Vincig. Ann. Mus. Genova, (2) xv. 1895, p. 27; Pfeff. Thierw. O.-Afr., Fische, p. 71 (1896).



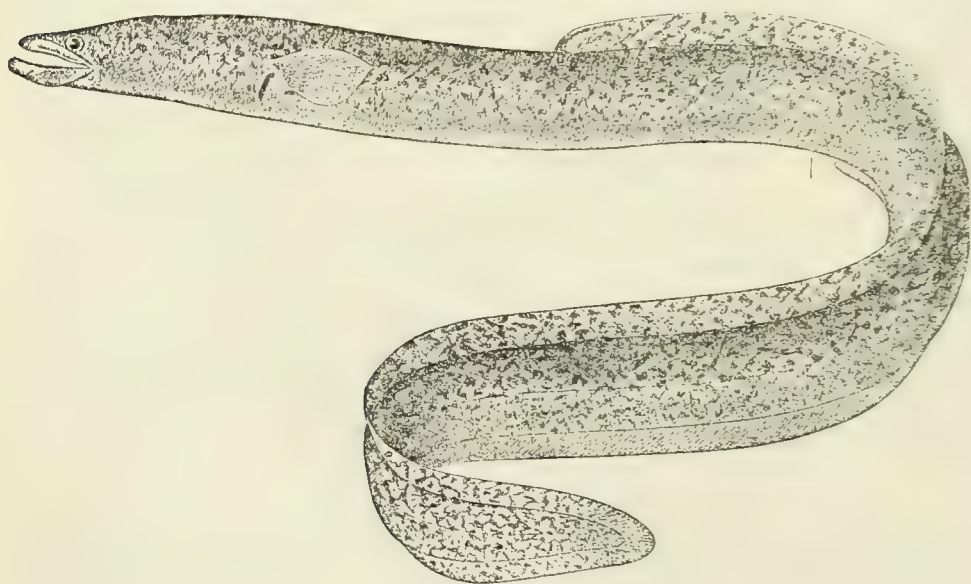
*Anguilla macrophthalma*, Peters, op. cit. p. 99, pl. xix. ; Günth. t. c. p. 28.

*Anguilla bengalensis*, Günth. t. c. p. 27, and Proc. Zool. Soc. 1894, p. 91 ; Bouleng.  
Proc. Zool. Soc. 1902, ii. p. 224.

? *Anguilla hildebrandti*, Sauv. Hist. Madag., Poiss. p. 499, pl. xlix. A. fig. 1  
(1891).

Vomerine patch of teeth tapering to a very narrow band ; maxillary and mandibular teeth tapering on the sides to a single or double series on the outer side, separated by an interspace from an inner series of minute teeth, which may be very indistinct. Mouth extending to below posterior border of eye or beyond ; lower jaw projecting. Distance from end of snout to gill-opening  $2\frac{2}{3}$  to  $3\frac{1}{2}$  times in distance from end of snout to vent. Tail longer than the body. Origin of dorsal nearly midway between pectoral and vent, or a little nearer the former or the

Fig. 5.



*Anguilla bengalensis*.

Zambesi (type of *A. labiata*), after Peters (Reise Mossamb.).  $\frac{1}{2}$ .

latter. Pectoral  $2\frac{1}{2}$  to 3 times in its distance from end of snout. Olive above, often marbled with blackish. Vertebrae 104-108.

Total length 1200 millim.

Indian and South Pacific Oceans, entering rivers of East and South Africa.

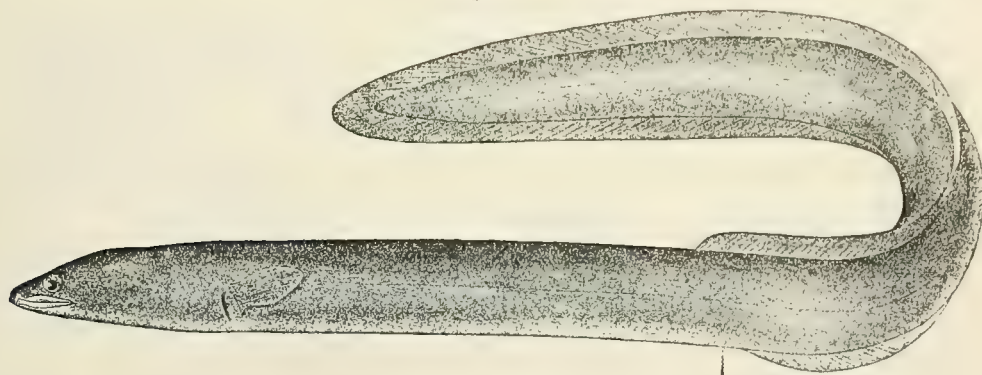
1. Ad.	Mathoiya R. (Tana), 4000 ft.	S. L. Hinde, Esq. (P.).
2. Ad.	Thikathika R. (Tana).	Prof. J. W. Gregory (P.).
3. Ad.	Athi R., near Chanjavi.	..

4-5. Hgr.	Zanzibar.	Sir L. Playfair (P.).
6. Hgr.	„	Sir J. Kirk (C.).
7. Ad.	Umgeni R., near Pietermaritzburg.	Dr. E. Warren (P.).
8-9. Hgr.	Durban.	Mr. T. Ayres (C.).
10. Ad.	Buffalo R., near King Williams-town.	Major H. Trevelyan (P.).
11. Ad., skin, type of <i>A. johannæ</i> .	Johanna, Comoro Is.	Sir L. Playfair (P.).
12. Skel.	— ?	

#### 4. ANGUILLA AUSTRALIS.

- Richards. Proc. Zool. Soc. 1841, p. 22, and Tr. Zool. Soc. iii. 1843, p. 157;  
M. Weber, Zool. Jahrb., Suppl. xv. i. 1912, p. 593.  
*Anguilla bicolor*, McClell. Calc. Journ. N. H. 1845, p. 178, pl. vi. fig. 1; Günth.  
Cat. Fish. p. 35 (1870).  
*Muraena macrocephala*, Rapp, Jahresh. Ver. Nat. Württemb. iv. 1849, p. 142, pl. ii.  
*Muraena (Anguilla) virescens*, Peters, Mon. Berl. Ac. 1852, p. 684.  
*Anguilla ambiodon*, Playf. & Günth. Fish. Zanzib. p. 125, fig. (1866); Günth.  
Cat. p. 37.  
*Anguilla virescens*, Peters, Reise Mossamb. iv. p. 101, pl. xxiii. fig. 2 (1868);  
Pfeff. Thierw. O.-Afr., Fische, p. 71 (1896); Günth. Fische Südsee, p. 392  
(1910).  
*Anguilla virescens*, part., Günth. Cat. p. 35.

Fig. 6.



*Anguilla australis.*

Lieuare R. (type of *A. virescens*), after Peters (Reise Mossamb.).  $\frac{1}{2}$ .

Teeth forming broad bands, in 4 to 10 series on the sides of the upper and lower jaws \*. Mouth extending to below posterior border of eye

\* In this, as in other species, the bands of teeth are wider in the adult than in the young, the great width of these bands in the type of *A. ambiodon* being due to its large size (1070 millim.).

or beyond; lower jaw projecting. Distance from end of snout to gill-opening 3 to  $3\frac{1}{2}$  times in distance from end of snout to vent. Tail longer than body. Origin of dorsal above or slightly in advance of vent. Pectoral  $2\frac{1}{2}$  to 4 times in distance from end of snout. Olive or dark green above, yellowish or white beneath. Vertebrae 105-109.

Total length over 1 metre.

Indian and South Pacific Oceans; entering rivers of East Africa and Natal.

1. Hgr.	Zanzibar.	Sir L. Playfair (P.).
2. Ad., stffd., type of <i>A. amblodon.</i>	Seychelles.	„
3. Ad.	„	Prof. E. P. Wright (P.).
4. Ad.	Praslin, Seychelles.	Prof. J. Stanley Gardiner (P.).
5. Skel.	„        „	„        „
6-8. Ad.	Rodriguez.	G. Gulliver, Esq. (P.).
9. Hgr.	L. Usilonde, Zululand.	Dr. E. Warren (P.).

## 2. SPHAGEBRANCHUS.

Bloch, Schneid. Syst. Ichth. p. 535 (1801).

*Sphagebranchus*, part., Kaup, Cat. Apod. Fish. p. 24 (1856).

*Ophichthys*, part., Günth. Cat. Fish. viii. p. 54 (1870).

Body much elongate, serpentiform, scaleless. Pectoral fins absent; dorsal and anal fins very feebly developed; the pointed extremity of the tail free. Mouth large, without lips; jaws and palate with small pointed teeth; nostrils tubular, both on the upper lip. Gill-openings on the ventral side, separated by a narrow isthmus.

Atlantic and Indian Oceans. One species from the rivers of West Africa.

### 1. SPHAGEBRANCHUS CEPHALOPELTIS.

Bleek. Nat. Verh. Vet. Haarlem, (2) xviii. 1863, no. 2, p. 128.

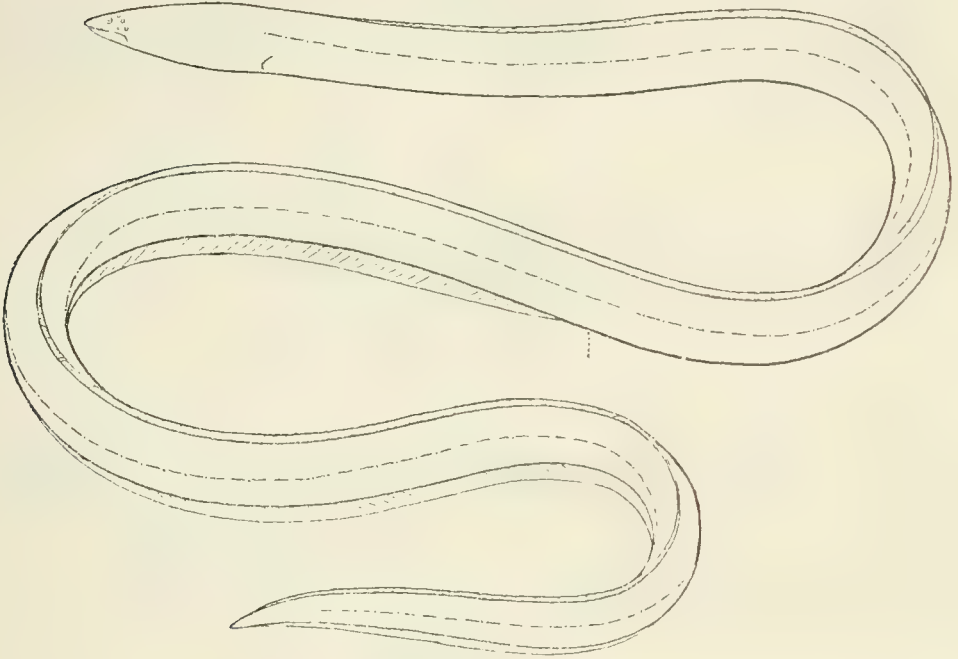
*Ophichthys* (*Sphagebranchus*) *buettikoferi*, Steind. Notes Leyd. Mus. xvi. 1894, p. 88, pl. iv. fig. 2; Pellegr. Bull. Soc. Philom. (10) i. 1909, p. 50.

Body extremely slender, cylindrical, its diameter 65 to 85 times in total length. Tail longer than body. Distance between end of snout and gill-openings 6 to 8 times in distance from end of snout to vent. Head very small, snout acutely pointed, projecting very strongly beyond lower jaw, the anterior teeth of the upper jaw remaining uncovered;



eye very small, equally distinct from end of snout and from angle of mouth. Dorsal originating at a short distance behind the gill-openings. Brownish above, white beneath.

Fig. 7.



*Sphagebranchus cephalopeltis.*  
Gambia.

Total length 535 millim.

Rivers of West Africa, from the Gambia to the Ogowe.—Types in Leyden Museum.

- |        |               |  |
|--------|---------------|--|
| 1. Ad. | Gambia.       | Sir A. Moloney (P.).                   |
| 2. Ad. | Ngomo, Ogowe. | Rev. E. Haug (C.) ; Paris Museum (E.). |

## Suborder V. HAPLOMI.

Air-bladder, if present, communicating with the digestive tract by a duct. Pectoral arch suspended from the skull; mesocoracoid arch absent. Fins without spines, the ventrals abdominal if present. Anterior vertebræ distinct, without Weberian ossicles.

This group, of which the Pike is the type, is represented in Africa by a single family.

## Fam. 1. GALAXIIDÆ.

Margin of the upper jaw formed by the præmaxillaries and the maxillaries, the latter behind the former and toothless. Parietals in contact with each other, and separating the frontals from the supraoccipital. Ribs inserted on strong autogenous parapophyses; epipleurals and epineurals present. Head and body naked. Vertical fins far back. Pectoral fins inserted very low down; ventrals, if present, with 6 or 7 rays.

Seas and fresh waters of the southern parts of South America, New Zealand and neighbouring islands, Australia and Tasmania, and the Cape of Good Hope.

A single genus in Africa.

## 1. GALAXIAS.

Cuv. Règne Anim. ii. p. 183 (1817); Cuv. & Val. Hist. Poiss. xviii. p. 340 (1846); Günth. Cat. Fish. vi. p. 208 (1866); Regan, Proc. Zool. Soc. 1905, ii. p. 365.

Ventral fins present. Dorsal fin with 10 to 19 rays, opposite or anterior to anal. Teeth conical, in a single series in the jaws and on the inner edge of each entopterygoid, in two series on the tongue. Vertebræ 53 to 64.

Distribution same as for the family.

## 1. GALAXIAS ZEBRATUS.

*Cobitis zebtratus*, Casteln. Mém. Poiss. Afr. Austr. p. 56 (1861).

*Galaxias capensis*, Steind. Sitzb. Ak. Wien, ciii. i. 1894, p. 460, pl. iii. fig. 2; M. Weber, Zool. Jahrb., Syst. x. 1897, p. 154.

*Galaxias zebtratus*, Bouleng. Ann. & Mag. N. H. (7) xvi. 1905, p. 51; Regan, Proc. Zool. Soc. 1905, ii. p. 367.

Depth of body  $4\frac{2}{3}$  to  $5\frac{1}{2}$  times in total length, length of head  $3\frac{4}{5}$  to  $4\frac{1}{4}$  times. Snout rounded, as long as or a little shorter than eye, which is about 4 times in length of head; interorbital width about 3 times in

length of head; jaws equal in front; mouth extending to below anterior border or anterior fourth of eye; teeth small, subequal. Gill-rakers short, 8 on lower part of anterior arch. Dorsal III-IV 7-8, originating at nearly equal distance from occiput and from base of caudal. Anal III-IV 7-8, originating below middle of dorsal. Pectoral  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head, or distance from its base to ventral. Latter 6-rayed, equally distant from end of snout and from base of caudal. Caudal rounded-subtruncate, continued anteriorly on caudal peduncle. Latter twice as

Fig. 8.

*Galaxias zebratus.*

Cape Town.

long as deep. Greyish or brownish, minutely speckled with darker and with numerous more or less regular dark (purplish) bars on the back and sides.

Total length 55 millim.

Cape of Good Hope, in fresh-water streams on the coast near Cape Town.—Types lost.

1. Ad.	Cape of Good Hope.	Sir A. Smith (P.) *.
2-5. Ad. & hgr.	Near Cape Town.	Prof. M. Weber (P.).

## 2. GALAXIAS PUNCTIFER.

*Cobitis punctifer*, Casteln. Mém. Poiss. Afr. Austr. p. 56 (1861).

*Galaxias punctifer*, Bouleng. Ann. & Mag. N. H. (7) xvi. 1905, p. 51; Regan, Proc. Zool. Soc. 1905, ii. p. 367, pl. x. fig. 3.

Barely distinguishable from the preceding by the rather more slender habit, the caudal peduncle being  $2\frac{1}{2}$  times as long as deep, and the shape of the caudal fin, which is truncate and slightly emarginate. The dark bars on the body are absent or confined to the back.

Total length 52 millim.

Occurs with the preceding near Cape Town.—Types lost.

1-2. Ad.	Flats near Cape Town.	S. African Museum (P.).
3-12. Yg.	Durban Road near Cape Town.	Mr. C. Grant (C.); C. D. Rudd, Esq. (P.).

\* This specimen, received in 1852 as from the Cape of Good Hope, had been referred by Günther (Cat. Fish. vi. p. 210) to *Galaxias fasciatus*, Gray, from New Zealand and neighbouring islands.



## Suborder VI. SCOMBRESOCES.

Air-bladder without pneumatic duct. Pectoral arch suspended from the skull; mesocoracoid arch absent. Fins without spines, the ventrals, if present, abdominal, or at least not connected with the scapular arch. Anterior vertebræ distinct, without Weberian ossicles.

Two families:—

- Mouth not protractile; lower pharyngeals completely united into a single bone; branchiostegal rays 9 or more . . . . . 1. *Scombresocidæ*, p. 14.
- Mouth protractile; lower pharyngeals distinct, or, if united, with the median suture persistent; branchiostegal rays 6 or less . . . . . 2. *Cyprinodontidæ*, p. 17.

## Fam. 1. SCOMBRESOCIDÆ.

Mouth not protractile, the maxillaries bordering the mouth at least to a slight extent. Supraoccipital in contact with the frontals. Lower pharyngeals completely united into a single bone, without a trace of median suture; branchiostegal rays 9 to 15. Præcaudal vertebræ with strong parapophyses, bearing the ribs and the epipleurals. Ventral fins with 6 rays.

Of almost cosmopolitan distribution and mostly marine.

Two genera have representatives in the fresh waters of Africa.

1. **HEMIRHAMPHUS.**

Cuv. Règne Anim. ii. p. 186 (1817); Cuv. & Val. Hist. Poiss. xix. p. 1 (1846), part.; Günth. Cat. Fish. vi. p. 259 (1866), part.; Bleek. Atlas Ichth. vi. p. 52 (1866).

*Hyporhamphus*, Gill, Proc. Ac. Philad. 1859, p. 131, and 1863, p. 272.

Lower jaw prolonged into a long slender beak \*, upper short, vertically movable, forming a triangular plate; both jaws with a narrow band of minute teeth. Head flat above. Body elongate, feebly compressed; covered with moderate or rather large smooth scales; lateral line close to the lower outline of body. Dorsal fin much longer than anal, behind the ventrals, which are inserted very far back. Pectoral inserted high up. Caudal fin forked. Vertebræ 34-38+15-18.

Seas of the tropical and warm parts of the world, a few species entering fresh waters.

\* Except in very young specimens.

## 1. HEMIRHAMPHUS FAR.

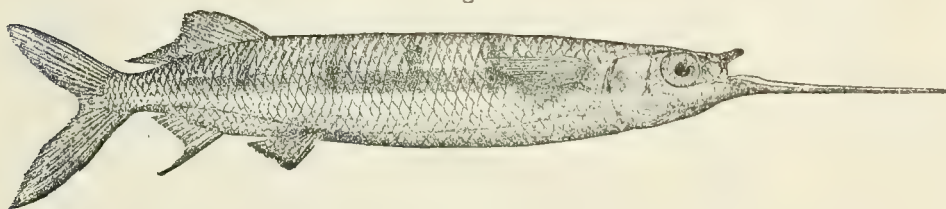
*Esox far*, Forsk. Deser. Anim. p. 67 (1775).

*Hemirhamphus commersonii*, Cuv. Règne Anim. 2nd ed. ii. p. 286 (1829) ; Cuv. & Val. Hist. Poiss. xix. p. 28 (1846) ; Bleek. Verh. Bat. Gen. xxiv. 1852, p. 17 ; Günth. Cat. Fish. vi. p. 271 (1866) ; Peters, Reise Mossamb. iv. p. 94 (1868).

*Hemirhamphus far*, Rüpp. N. Wirbelth. Abyss., Fische, p. 74 (1840) ; Bleek. Atlas Ichth. vi. p. 54, pl. vi. fig. 3 (1866) ; Klunz. Verh. zool.-bot. Ges. Wien, xx. 1870, p. 582 ; Day, Fish. Ind. p. 516, pl. cxx. fig. 3 (1878) ; Günth. Fische Südsee, p. 357 (1909).

Depth of body 6 to  $6\frac{1}{2}$  times in total length \*, length of head  $4\frac{1}{2}$  to 5 times. Beak  $1\frac{1}{4}$  to  $1\frac{2}{5}$  times length of head ; upper jaw much broader than long ; teeth more or less distinctly tricuspid ; eye better visible from below than from above, 3 to  $3\frac{1}{2}$  times in length of head ; inter-orbital width  $2\frac{3}{4}$  to 3 times in length of head. Dorsal 13-14. Anal 11-12, below second half of dorsal. Pectoral  $\frac{3}{4}$  length of head. Ventral

Fig. 9.

*Hemirhamphus far*.

Indian Ocean, after Day (*l. c.*).  $\frac{1}{2}$ .

inserted twice as far from anterior or posterior border of eye as from caudal. Caudal deeply forked, lower lobe the longer, median rays about equal to diameter of eye. Caudal peduncle as long as deep. 52-55 scales in longitudinal series. Back dark greenish, sides with a silvery band and usually with four or five rounded blackish spots or short vertical bars.

Total length 400 millim.

Red Sea and Indian Ocean, South Pacific, sometimes entering rivers.

1. Ad., skin.	Zanzibar.	Sir L. Playfair (P.).
2. Ad.	Mozambique.	Prof. Peters (P.).
3. Ad.	Mazoë, Rhodesia.	J. ff. Darling, Esq. (P.).
4, 5. Ad.	Natal.	
6. Skel.	„	

\* In describing the proportions of the head and body, the projecting part of the lower jaw is excluded.

## 2. ZENARCHOPTERUS.

*Hemirhamphus*, part., Cuv. & Val. Hist. Poiss. xix. p. 1 (1846) ; Günth. Cat. Fish. vi. p. 259 (1866).

*Zenarchopterus*, Gill, Proc. Ac. Philad. 1863, p. 273 ; Bleek. Atlas Ichth. vi. p. 63 (1866).

Distinguished from the preceding by the rounded caudal fin, and the modification of the anal fin in males in connexion with pairing habits, the species of this genus being viviparous. Vertebrae 31+13.

Coasts and fresh waters of the Indian and South Pacific Oceans.

## 1. ZENARCHOPTERUS DISPAR.

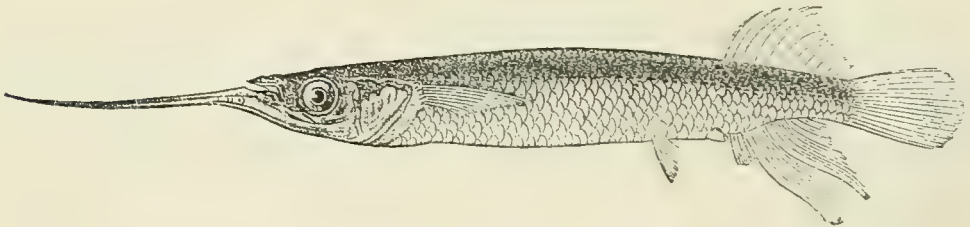
*Hemirhamphus dispar*, Cuv. & Val. Hist. Poiss. xix. p. 58, pl. ccccclviii. (1846) ; Bleek. Nat. Tijdschr. Nederl. Ind. vi. 1854, p. 498 ; Günth. Cat. Fish. vi. p. 274 (1866) ; Playf. Proc. Zool. Soc. 1867, p. 868 ; Klunz. Verh. zool.-bot. Ges. Wien, xx. 1870, p. 582 ; Peters, Mon. Berl. Ac. 1871, p. 32 ; Day, Fish. Ind. p. 517, pl. cxix. fig. 5 (1878).

*Zenarchopterus dispar*, Bleek. Nederl. Tijdschr. Dierk. iii. 1866, p. 164, and Atlas Ichth. vi. p. 63, pl. vii. fig. 4 (1866) ; Günth. Fische Südsee, p. 358 (1909).

*Hemirhamphus commersonii*, part., Peters, Reise Mossamb. iv. p. 94 (1868).

Depth of body 6 to  $6\frac{1}{2}$  times in total length, length of head 4 times. Beak  $1\frac{2}{3}$  to  $1\frac{3}{4}$  times length of head, with membranous crest below ; upper jaw as long as broad ; teeth minute, in villiform bands ; eye better visible from below than from above, 4 times in length of head.

Fig. 10.



*Zenarchopterus dispar*.

Type, after Cuvier and Valenciennes.

Dorsal 11-12, two of the median rays thickened and more or less produced in the male. Anal 11-12, divided into two portions in the male, the second portion beginning with the sixth ray, which, like the seventh, is much thickened and produced, about  $\frac{3}{4}$  length of head. Pectoral  $\frac{3}{4}$  length of head. Ventral inserted twice as far from præoperculum or posterior border of eye as from caudal. Caudal rounded, upper rays



shortest. Caudal peduncle deeper than long. 40–43 scales in longitudinal series. Olive above; a silvery lateral band; male usually with black dots between the rays of the dorsal and with the anterior part of the anal blackish.

Total length 170 millim.

East Coast of Tropical Africa to Polynesia.—Type in Paris Museum.

1–4. Ad.	Seychelles, in fresh water.	Sir L. Playfair (P.).
5. Skel.	„	„

## Fam. 2. CYPRINODONTIDÆ.

Mouth protractile, the maxillaries excluded from the oral border. Parietals separated from each other, the supraoccipital in contact with the frontals. Præcaudal vertebræ with strong parapophyses, bearing the ribs; epipleurals inserted on the ribs. Head and body covered with scales. Vertical fins differing in size and position according to the genera, and often very strikingly in the two sexes. Ventral fins, if present, with 5 to 7 rays.

The African genera belong to the oviparous carnivorous type, in which the digestive tract is short and the anal fin of the male is not modified into an intromittent organ.

Fresh and brackish waters of Southern Europe, Southern and Eastern Asia, Africa, and America.

### *Synopsis of the Genera.*

I. Teeth tricuspid; dorsal fin originating in advance of the anal, which has 9 to 14 rays.

Ventral fins present . . . . .	1. <i>Cyprinodon</i> , Lacep., p. 18.
Ventral fins absent . . . . .	2. <i>Tellia</i> , Gerv., p. 22.

II. Teeth unicuspid.

A. Scales cycloid; 9 to 19 anal rays.

Dorsal fin originating in advance of or nearly opposite to origin of anal; ventral fins distant from the pectorals . . . . .	3. <i>Fundulus</i> , Lacep., p. 23.
Dorsal fin originating well behind origin of anal; ventral fins distant from the pectorals . . . . .	4. <i>Haplochilus</i> , McCl., p. 40.
Dorsal fin originating well behind origin of anal; ventral fins below pectorals . . . . .	5. <i>Procatopus</i> , Blgr., p. 78.

B. Scales ctenoid; 27 to 30 anal rays . . . . . 6. *Lamprichthys*, Regan, [p. 80.]

## 1. CYPRINODON.

Lacep. Hist. Poiss. v. p. 486 (1803); Günth. Cat. Fish. vi. p. 301 (1866);

Bouleng. Fish. Nile, p. 406 (1907).

*Lebias*, Cuv. Règne Anim. ii. p. 199 (1817).

*Aphanius*, Nardo, Prodr. Adr. Ichthyol. pp. 17 & 23 (1827).

*Micromugil*, Gulia, Tent. Ichthyol. Medit. p. 11 (1861).

Mouth small; teeth of moderate size, tricuspid, in a single series. Head flat above. Scales rather large, not denticulated. Dorsal fin commencing in advance of the anal, both fins larger in the males than in the females. Ventral fins present, far behind the base of the pectorals. Vertebræ 24–28.

Fresh and brackish waters of the Mediterranean basin, South-Western Asia, the South-Eastern United States, Mexico, and Cuba.

Three species in North Africa:—

Dorsal 10–13, longest rays shorter than head; male [p. 18.

without or with a single dark bar on the caudal fin. 1. *C. fasciatus*, Val.,

Dorsal 9–10, longest rays at least as long as head in

male; male with two or three dark bars on the [p. 20.

caudal fin . . . . . 2. *C. dispar*, Rüpp.,

Dorsal 9–10, longest rays shorter than head; male with [p. 21.

three to five dark bars on the caudal fin . . . . 3. *C. iberus*, C. & V.,

## 1. CYPRINODON FASCIATUS.

*Lebias fasciatus*, Val. in Humb. & Bonpl. Observ. Zool. ii. p. 160, pl. li. fig. 4 (1821); Wagner, Isis, 1828, p. 1055.

*Aphanius nanus*, Nardo, Prodr. Adr. Ichthyol. pp. 17 & 23 (1827).

*Aphanius fasciatus*, Nardo, ll. cc.

*Lebias lineo-punctata*, Wagner, l. c. pl. xii. figs. 1–6.

*Lebias sarda*, Wagner, l. c. fig. 7.

*Pæcilia calaritana*, Bonelli, in Cuv. Règne Anim. 2nd ed. ii. p. 280 (1829).

*Lebias calaritana*, Costa, Faun. Nap., Pesci, ii. p. 33, pl. xvii. fig. 2 (1839);

Canestrini, Arch. p. la Zool. iv. 1866, p. 125, and Fauna d'Ital., Pesci, p. 19

(1874); Lepori, Atti Acc. Rom. (3) ix. 1881, p. 481; Garman, Mem. Mus.

Comp. Zool. xix. 1895, p. 19.

*Lebias flava*, Costa, op. cit. p. 35, pl. xvii. fig. 1.

*Cyprinodon calaritanus*, Cuv. & Val. Hist. Poiss. xviii. p. 151 (1846); Bellotti,

Mem. Acc. Torin. xvii. 1858, p. 159; Günth. Cat. Fish. vi. p. 302 (1866);

Gervais, Zool. Pal. Gén. p. 203, pl. xlv. fig. 5 (1869); Playf. & Letourn.

Ann. & Mag. N. H. (4) viii. 1871, p. 389; Sauv. in Révoil, Faune Pays

Çomalis, Cyprinod. p. 6 (1882); Vincig. Ann. Mus. Genova, xx. 1884,

p. 441; Rolland, Rev. Scientif. (4) ii. 1894, p. 418, figs.; Bouleng. Fish.

Nile, p. 407, pl. lxxix. figs. 1 & 2 (1907).

*Cyprinodon fasciatus*, Cuv. & Val. t. c. p. 156; Martens, Arch. f. Nat. xxiv. 1858, p. 153, pl. iv. fig. 4; Günth. t. c. p. 303; Sauv. op. cit. p. 8.

*Cyprinodon hammonis*, Cuv. & Val. t. c. p. 169; Martens, t. c. p. 155, pl. iv. fig. 5; Sauv. op. cit. p. 10, pl. iii. figs. 3 & 4.

*Cyprinodon dispar* (non Rüpp.), Günth. Proc. Zool. Soc. 1859, p. 474.

*Cyprinodon cyanogaster*, Guichen. Rev. & Mag. Zool. (2) xi. 1859, p. 378.

*Cyprinodon doliatus*, Guichen. t. c. p. 379.

Depth of body 3 to 4 times in the total length, length of head 3 to  $3\frac{3}{4}$  times. Snout very short, squarely truncate, with the mouth terminal and directed upwards, the lower jaw projecting very slightly; 12 to 16 teeth in each jaw; diameter of eye 3 to  $3\frac{1}{2}$  times in the length of the head, interorbital width about twice. Dorsal 10–12 (rarely 13), originating a little in advance of the anal and at nearly equal distance from eye and from root of caudal, longest rays about  $\frac{1}{2}$  length of head in females,  $\frac{2}{3}$  to  $\frac{3}{4}$  in males. Anal 10–12 (rarely 9 or 13), similar to

Fig. 11.



*Cyprinodon fasciatus*.

♂ ♀, Ghet-el-Nassara (F. N.).

dorsal. Pectoral about  $\frac{2}{3}$  length of head, much longer than ventral, which is nearly midway between end of snout and root of caudal. Caudal truncate. Caudal peduncle  $1\frac{1}{4}$  to  $1\frac{2}{3}$  times as long as deep. 25–30 (usually 26–28) scales in longitudinal series, 22–26 (26–30 in Dalmatian specimens) round body in front of ventral fins; lateral line usually indicated by an interrupted series of pits. Dark greyish olive above, white beneath; fins white in females, yellow in males, the dorsal in the latter being bordered with black; a blackish bar sometimes crosses the caudal fin in males; females with 10 to 15 narrow blackish bars on each side of the body, not extending to the back or belly, and a more or less distinct round black spot at the root of the caudal fin; males with broader dark bars, usually broader than the spaces between them, and extending down to the bases of the ventral and anal fins, these bars varying from grey to black.

Total length 57 millim.

Fresh and brackish waters of Italy, Sardinia, Istria, Dalmatia, Asia Minor, Cyprus, and North Africa.—Types in Paris Museum.



1-4, 5-7. Ad.	Algeria.	Sir Lambert Playfair (P.).
8. Ad.	Oran, Algeria.	Mr. A. Rachow (P.).
9-15. Types of <i>C. doliatus</i> .	Biskra, Algeria.	Paris Museum (E.).
16-22. Types of <i>C. cyanogaster</i> .	„ „	„
23. Ad.	„ „	Hon. W. Rothschild (P.).
24-29. Ad. & hgr.	„ „	W. J. Harding King (P.).
30. Ad.	Hamman Sahahie, Algeria.	R. Gurney, Esq. (P.).
31-33, 34. Ad.	Crater lake, Algeria.	„
35-36. Ad.	Hot springs of Sidi Ohkbar, Algerian Sahara.	Canon Tristram (P.).
37-43. Ad.	Wed Rir, Algerian Sahara.	M. Jus (C.) ; Paris Museum (E.).
44-46, 47-48. Ad.	Susa, Tunisia.	Mr. L. Fraser (C.).
49-60. Ad.	Lake Menzaleh, Egypt.	L. Loat, Esq. (C.).
61-89. Ad. & hgr.	Ghet-el-Nassara, nr. L. Menzaleh.	„
90. Skel.	„ „	„
91-94. Ad.	Gemel, nr. L. Menzaleh.	„
95-103. Ad.	Near Alexandria.	Capt. S. Flower (P.).
104-108. Ad. & yg.	Lower Egypt.	Dr. J. C. Mitchell (P.).
109-128. Ad.	L. Tamsah, Isthmus of Suez.	Sir R. Owen (P.).
129. Ad.	Sardinia.	
130-163. Ad. & hgr.	South of Zara, Dalmatia.	D. Gavin, Esq. (P.).
164. Ad.	Albistan, Asia Minor.	C. G. Danford, Esq. (P.).
165-184. Ad.	Cyprus.	Mr. H. Rolle (C.).

## 2. CYPRINODON DISPAR.

*Lebias dispar*, Rüpp. Fische Roth. Meer. p. 66, pl. xviii. figs. 1 & 2 (1828).

*Cyprinodon lunatus*, Cuv. & Val. Hist. Poiss. xviii. p. 161 (1846).

*Cyprinodon dispar*, part., Günth. Cat. Fish. vi. p. 303 (1866).

*Cyprinodon dispar*, Klunz. Verh. zool.-bot. Ges. Wien, xx. 1870, p. 587; Day, Fish. Ind. p. 521, pl. cxxi. figs. 1 & 2 (1877); Bouleng. Fish. Nile, p. 411, pl. lxxix. figs. 3 & 4 (1907).

*Cyprinodon stoliczkanus*, Day, Journ. As. Soc. Beng. xli. 1872, p. 258.

*Lebias dispar*, part., Garm. Mem. Mus. Comp. Zool. xix. 1895, p. 34.

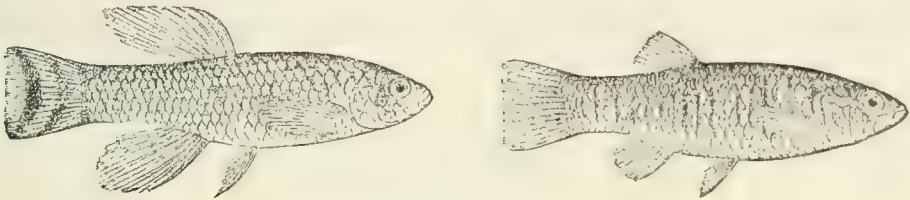
Closely allied to, and difficult to distinguish from, *C. fasciatus* in the female sex; but it grows to a larger size, has only 9 or 10 rays in the dorsal and 10 or 11 in the anal, these fins being much more developed in full-grown males. 25-28 scales in longitudinal series, 22-24 round body. The dark cross-bars, more or less distinct (up to 22 in number) in females, are absent in the male, the body of which is

covered with more or less distinct round light (in life, blue) spots; caudal fin of male with 2 or 3 crescentic black bars.

Total length 80 millim.

Fresh and brackish waters round the Red Sea and Persian Gulf; Cutch, N.W. India.—Types in Senckenberg Museum, Frankfort-a.-M.

Fig. 12.



*Cyprinodon dispar.*

♂ ♀, types, Abyssinia (F. N.).

1-12. Ad. & hgr.	Khor Arbat, fresh-water stream running out of the mountains N. of Suakin.	A. L. Butler, Esq. (P.).
13-15. Types.	Coast of Abyssinia.	Dr. Rüppell (C.).
16-21. Ad.	Muscat.	Col. A. S. G. Jayakar (P.).
22. Skel.	"	"
23-50.	Gala, near Muscat.	"
51-56.	Makulla, Persia.	E. Lort Phillips, Esq. (P.).
57-78. Types of <i>C. stoliczkanus</i> .	Cutch.	Dr. F. Stoliczka (C.); F. Day, Esq. (P.).

### 3. CYPRINODON IBERUS.

Cuv. & Val. Hist. Poiss. xviii. p. 160, pl. ccccxviii. (1846); Playf. & Letourn.

Ann. & Mag. N. H. (4) viii. 1871, p. 390.

*Lebias ibericus*, Steind. Sitz. Ak. Wien, lii. i. 1865, p. 483, pl. —. figs. 1-3.

Structurally also barely distinguishable from *C. fasciatus*, but body rather shorter. The specimens in the collection have 9 or 10 rays

Fig. 13.



*Cyprinodon iberus.*

♂, type, after Cuvier and Valenciennes.

in the dorsal and anal and 26 to 28 scales in the lateral line. Male with 16 to 20 dark vertical bars on the body, and 3 to 5 on

the caudal fin; female with scattered black spots or with a lateral series of black spots and with or without traces of dark bars on the caudal.

Total length 50 millim.

Spain and Algeria (High Plateaux).—Types in Paris Museum.

1-2. Ad.	Barcelona, Spain.	Frl. A. Fahr (C.) ; Dr. W. Wolterstorff (P.).
3-4. Ad.	Seville, Spain.	Dr. H. Gadow (C.).
5-6. Ad.	Kreider, Prov. Oran, Algeria.	Dr. Sergent (C.) ; Paris Museum (E.).
7-8. Ad.	„ „	Dr. F. Werner (P.).

## 2. TELLIA.

Gervais, Ann. Sc. Nat., Zool. (3) xix. 1853, p. 15.

Distinguished from *Cyprinodon* by the absence of ventral fins.

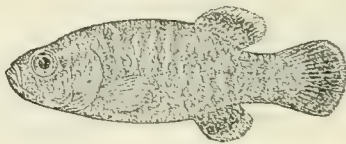
A single species is known.

### 1. TELLIA APODA.

Gerv. l. c., and Zool. Pal. Génér. p. 203, pl. xlv. fig. 6 (1869) ; Val. C.R. Ac. Sc. xlv. 1858, p. 715 ; Playf. & Letourn. Ann. & Mag. N. H. (4) viii. 1871, p. 390.

In form stouter than *Cyprinodon fasciatus*. Depth of body  $2\frac{1}{2}$  to 3 times in total length, length of head 3 to  $3\frac{1}{2}$  times. Eye as long as or a little longer than snout.  $3\frac{1}{3}$  to  $3\frac{2}{3}$  times in length of head,

Fig. 14.



*Tellia apoda*.  
♂, Algeria.

$1\frac{1}{2}$  times in interorbital width. Dorsal 13-15, originating slightly in advance of anal and midway between head and base of caudal. Anal 13-14. Pectoral  $\frac{3}{5}$  length of head. Caudal rounded. Caudal peduncle as long as deep. 26-28 scales in a longitudinal series, 24-28 round body in front of anal. Greenish olive, with more or less distinct darker and lighter cross-bars; female with black spots on dorsal and anal; male



with several more or less distinct dark bars on the caudal, or with the vertical fins dark and light-edged, with light dots at the base.

Total length 60 millim.

High Plateaux of Algeria, Northern Slope of Atlas.—Types in Paris Museum.

- |        |                         |  |
|--------|-------------------------|--|
| 1. Ad. | Algeria.                | M. Taczanowski (C.); Paris<br>Museum (E.). |
| 2. Ad. | Thermal springs, Batna. | M. Guyon (C.); Paris<br>Museum (E.).       |

### 3. FUNDULUS.

Lacep. Hist. Poiss. v. p. 37 (1803); Günth. Cat. Fish. vi. p. 318 (1866);  
Bouleng. Fish. Nile, p. 413 (1907).

*Hydrargyra*, Lacep. t. c. p. 378.

*Nothobranchius*, Peters, Mon. Berl. Ac. 1868, p. 145, and Reise Mossamb. iv. p. 60 (1868).

Mouth small; teeth conical, in a narrow band, those of the outer series largest. Head usually flat above. Scales moderate or rather small, not denticulated. Dorsal fin commencing before or nearly opposite the origin of the anal. Ventral fins present, far behind the base of the pectorals. Vertebrae 29–33.

Fresh and brackish waters of Spain, Tropical and South Africa, Japan, North and Central America.

#### *Synopsis of the Species.*

- I. Dorsal and anal exactly opposite to each other, or the origin of the one slightly in front of or slightly behind that of the other.
  - A. Not more than 35 scales in a longitudinal series (not including smaller scales on base of caudal).
    - 1. Dorsal 11–14.
      - a. Anal 12–14; 26–29 scales in longitudinal series.
        - D. 11–13; A. 13–14; Sc. 26–29; caudal peduncle about  $1\frac{1}{2}$  times as long as deep. . . 1. *F. bivittatus*, Lönnb., p. 24.
        - D. 11–12; A. 12–13; Sc. 26–28; caudal peduncle nearly twice as long as deep. . . 2. *F. loennbergii*, Blgr., p. 25.
      - b. Anal 14–16; 28–32 scales in longitudinal series.
        - D. 12–13; A. 14–16; Sc. 28–32; snout as long as or a little shorter than eye, which is 4 times in length of head in adult. . . 3. *F. gardneri*, Blgr., p. 26.
        - D. 13–14; A. 15–16; Sc. 29–31; snout much shorter than eye, which is  $3\frac{1}{2}$  times in length of head in adult. . . . . 4. *F. spurrelli*, Blgr., p. 27.

## 2. Dorsal 14-16.

a. 20-26 scales round body in front of ventrals.

α. Space between eye and lip  $\frac{1}{4}$  to  $\frac{1}{3}$  diameter of eye.

- D. 14-15 ; A. 14-15 ; Sc. 33-35 ; diameter of eye  $1\frac{1}{2}$  times in interorbital width . . . 5. *F. batesii*, Blgr., p. 28.  
 D. 15-16 ; A. 16-18 ; Sc. 30-34 ; diameter of eye  $1\frac{2}{3}$  to 2 times in interorbital width . . . 6. *F. gularis*, Blgr., p. 29.  
 D. 15-16 ; A. 15-17 ; Sc. 25-27 ; diameter of eye  $1\frac{1}{4}$  to  $1\frac{1}{3}$  times in interorbital width. . . 7. *F. arnoldi*, Blgr., p. 30.  
 D. 16 ; A. 15 ; Sc. 27-28 ; diameter of eye  $1\frac{2}{3}$  times in interorbital width . . . . . 8. *F. palmquistii*, Lönnb., p. 31.

β. Space between eye and lip very narrow, the latter forming an angle fitting into a notch close to the former.

- D. 14 ; A. 15-16 ; Sc. 28-30 ; anal originating a little in advance of dorsal . . . . . 9. *F. walkeri*, Blgr., p. 32.  
 D. 15-16 ; A. 14-16 ; Sc. 28-30 ; anal opposite to dorsal . . . . . 10. *F. orthonotus*, Peters, p. 33.  
 D. 14-15 ; A. 17-18 ; Sc. 30-31 ; anal opposite to dorsal . . . . . 11. *F. melanospilus*, Pfeff., p. 34.

b. 32-36 scales round the body.

- D. 15-16 ; A. 16-17 ; Sc. 30-32 . . . . . 12. *F. neumanni*, Hilg., p. 35.

## 3. Dorsal 17-19 ; anal 17-19.

- D. 17-18 ; A. 18-19 ; Sc. 27-30 ; diameter of eye  $1\frac{2}{3}$  to 2 times in interorbital width . . . 13. *F. guentheri*, Pfeff., p. 35.  
 D. 17 ; A. 17-18 ; Sc. 30-31 ; diameter of eye  $1\frac{1}{2}$  times in interorbital width . . . 14. *F. twniopygus*, Hilg., p. 37.  
 D. 17-19 ; A. 17-19 ; Sc. 33-36 ; diameter of eye nearly twice in interorbital width . . . 15. *F. sjoestedti*, Lönnb., p. 38.

B. 40-42 scales in longitudinal series, about 50 round body.

- D. 16-17 ; A. 17-18 . . . . . 16. *F. microlepis*, Vincig., p. 39.

## II. Anal originating below middle of dorsal ; 36 scales in longitudinal series.

- D. 12 ; A. 10-11 ; diameter of eye 4 times in length of head and twice in interorbital width . . . . . 17. *F. nisorius*, Cope, p. 39.  
 D. 13 ; A. 13 ; diameter of eye  $2\frac{1}{2}$  times in length of head and little less than interorbital width . . . . . 18. *F. capensis*, Garm., p. 39.

## 1. FUNDULUS BIVITTATUS.

Lönnberg, Öfv. Ak. Forh. Stockh. 1895, p. 190 ; Paul Arnold, Bl. Aq. Terr. 1908, p. 653, fig., and Woch. Aq. Terr. 1911, p. 601, fig.

Depth of body  $3\frac{2}{3}$  to  $4\frac{1}{3}$  times in total length, length of head 3 to

$3\frac{1}{2}$  times. Head flat above; snout short and broad, a little shorter than eye; mouth directed upwards; lower jaw projecting; eye 3 to  $3\frac{1}{2}$  times in length of head,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times in interorbital width; space between eye and lip about  $\frac{1}{4}$  diameter of former. Dorsal 11-13, originating midway between centre or posterior border of eye and root of caudal, posterior rays produced in males, sometimes much longer than head. Anal 13-14, originating slightly in advance of dorsal, similar to the latter. Pectoral  $\frac{2}{3}$  to  $\frac{4}{5}$  length of head, reaching base of ventral or a little beyond; ventral small, midway between end of snout and base of caudal or a little nearer the former. Caudal rounded, with one or two upper and lower rays produced in males. Caudal peduncle about  $1\frac{1}{2}$  times as long as deep. 26-29 scales in longitudinal series, 22-24 round body in front of ventrals; lateral line absent,

Fig. 15.

*Fundulus bivittatus.*

♂, Old Calabar.

or indicated by a series of pits. Yellowish olive or brownish, more or less spotted with crimson, frequently with two dark bands, the upper proceeding from the tip of the snout, through the eye, to the root of the caudal, the lower from below the eye, through the base of the pectoral; vertical fins edged with purplish red in the male.

Total length 62 millim.

Cameroon, Calabar.—Type in Stockholm Museum.

1-5. Ad. & hgr.	Kribi R., S. Cameroon.	G. L. Bates, Esq. (C.).
6-15. Ad. & hgr.	Tributaries of Lobi R., S. Cameroon.	„
16-17. Ad.	Banaberi Swamps, inland of Duala, Cameroon.	Mr. B. Schröder (P.).
18-19. Ad.	Old Calabar.	Mr. J. Paul Arnold (P.).

## 2. FUNDULUS LOENNBERGII.

Bouleng. Ann. & Mag. N. H. (7) xii. 1903, p. 440.

Depth of body 4 to  $4\frac{1}{2}$  times in total length, length of head  $3\frac{1}{3}$  to 4 times. Head flat above; snout short and broad, as long as eye;



mouth directed upwards; lower jaw projecting; eye  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times in length of head,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times in interorbital width; space between eye and lip about  $\frac{1}{4}$  diameter of former. Dorsal 11-12, originating midway between eye and root of caudal, some of the posterior rays produced into long filaments in males. Anal 12-13, exactly opposite to dorsal. Pectoral about  $\frac{2}{3}$  length of head, reaching a little beyond

Fig. 16.

*Fundulus loennbergii.*

♂, type.

base of ventral, which is small and midway between end of snout and base of caudal or a little nearer the former. Caudal acuminate, trilobate, with some of the rays produced into filaments, in males. Caudal peduncle nearly twice as long as deep. 26-28 scales in longitudinal series, 22 round body in front of ventrals; lateral line absent, or indicated by a series of pits. Yellowish olive, most of the scales with a crimson spot or vertical bar; head with crimson wavy lines; fins dark, all except the pectorals with small crimson spots.

Total length 50 millim.

South Cameroon.

1-2. Types.	Kribi R.	G. L. Bates Esq. (C.).
3-6. Ad.	Zima Country.	„
7-10. Ad.	Efulen.	„

### 3. FUNDULUS GARDNERI.

Bouleng. Ann. & Mag. N. H. (8) viii. 1911, p. 261.

*Haplochilus brucei*, Bouleng. t. c. p. 263.

Depth of body 4 to  $4\frac{1}{2}$  times in total length, length of head 3 to  $3\frac{2}{3}$  times. Head flat above; snout short and broad, as long as or a little shorter than eye; mouth directed upwards; lower jaw projecting; eye  $3\frac{1}{3}$  (young) to 4 times in length of head,  $1\frac{2}{3}$  to 2 times in interorbital width; space between eye and lip about  $\frac{1}{4}$  diameter of former. Dorsal 12-13, originating at equal distance from head and from base of caudal; longest (posterior) rays  $\frac{2}{3}$  to once length of head. Anal 14-16,

originating slightly in advance of dorsal. Pectoral about  $\frac{2}{3}$  length of head, not reaching or just reaching base of ventral, which is small and midway between end of snout and base of caudal. Caudal rounded in the female, with one of the upper and one of the lower rays produced in the male. Caudal peduncle a little longer than deep. 28–32 scales in

Fig. 17.

*Fundulus gardneri.*

a. ♂, type. b. ♀, type of *H. brucii* ( $\frac{2}{3}$ ).

longitudinal series, 22–26 round body in front of ventrals; lateral line entirely absent, or indicated by a few pits. Olive above, white below; sides of head and body, chin, and fins with or without crimson spots; upper edge of dorsal and upper and lower edge of caudal white in the male.

Total length 60 millim.

Head-waters of Cross River, Calabar; Old Calabar; Lower Niger.

1–3. Types.	Okwoga (Lat. 70° N., Long. 7° 45' E.), head-waters of Cross R.	Capt. R. D. Gard'ner (P.).
4–11. Types of <i>H. brucii</i> .	Pool at Udi, Cross R.*	Major G. E. Bruce (P.).
12–16. Ad.	Bendi District, Cross R.	Major W. A. C. Cockburn (P.).
17. Hgr.	Old Calabar.	Mr. J. Paul Arnold (P.).
18. Yg.	Swamps between Agwarba and Awka, Lower Niger.	Capt. R. D. Gard'ner (P.).

#### 4. FUNDULUS SPURRELLI.

Bouleng. Proc. Zool. Soc. 1913, p. 52.

Depth of body 4 to  $4\frac{1}{3}$  times in total length, length of head  $3\frac{1}{2}$  to  $3\frac{3}{4}$  times. Head flat above; snout short and broad, much shorter than eye; mouth directed upwards; lower jaw projecting; eye  $3\frac{1}{2}$  times in

\* Since describing this fish, I have been informed by Major Bruce that Udi is in the Cross River basin—not Lower Niger, as I thought.

length of head,  $1\frac{2}{3}$  times in interorbital width; space between eye and lip about  $\frac{1}{5}$  diameter of former. Dorsal 13–14, originating at equal distance from head and from base of caudal; longest (posterior) rays  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Anal 15–16, originating slightly in advance of dorsal. Pectoral nearly  $\frac{2}{3}$  length of head, not quite reaching base of ventral, which is small and midway between end of snout and base of caudal. Caudal rounded in the female, subtruncate in the male. Caudal peduncle longer than deep. 29–31 scales in longitudinal series, 24–26 round body in front of ventrals; lateral line indicated by a more or less complete series of pits. Male pale yellowish green (in life), with numerous narrow, often paired, vertical bars of dark carmine; sides of head metallic green, variegated with carmine; gular (branchiostegal) region of a dark, rich blue; pectoral fin whitish, with an oblique crimson streak, ventral with red tip; vertical fins grey, dotted with

Fig. 18.

*Fundulus spurrelli.*♂ ♀, types.  $\times 1\frac{1}{3}$ .

carmine and broadly edged with yellow or orange, the yellow bands occupying the upper and lower fourths of the caudal. Female paler, more translucent, at times pinkish; fins white, dorsal and anal dotted with carmine.

Total length 42 millim.

Gold Coast.

1–5. Types.

Tano R., Gold Coast.

Dr. H. G. F. Spurrell (P.).

##### 5. FUNDULUS BATESII.

Bouleng. Ann. & Mag. N. H. (8) viii. 1911, p. 261.

Depth of body  $4\frac{1}{2}$  times in total length, length of head  $3\frac{1}{2}$  times. Head flat above; snout short and broad, as long as eye; mouth directed upwards; lower jaw projecting; eye  $3\frac{2}{3}$  times in length of head,  $1\frac{1}{2}$  times in interorbital width. Dorsal 14–15, originating midway between eye and root of caudal, longest (posterior rays)  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head; space



between eye and lip very narrow, the latter forming an angle fitting into a notch close to the former. Anal 14–15, exactly opposite to dorsal. Pectoral  $\frac{2}{3}$  length of head, not quite reaching base of ventral, which is small and midway between end of snout and base of caudal. Caudal acuminate, bifurcate in the middle in male. Caudal peduncle  $1\frac{2}{3}$  times

Fig. 19.

*Fundulus batesii*.

♂, type.

as long as deep. 33–35 scales in longitudinal series, 24–26 round body in front of ventrals; lateral line represented by a series of pits. Male olive-brown, profusely spotted with crimson; a crimson streak from eye to eye round the chin; dorsal and anal fins dark purplish, anal edged with lighter; pectoral paler, edged with crimson; caudal broadly edged with yellow above and beneath. Female yellowish olive, with small crimson spots.

Total length 60 millim.

South Cameroon (Congo Basin).

1–2. Types.

Ja R., at Bitye.

G. L. Bates, Esq. (C.).

3–8. Types.

Bumba R., at Assobam.

„

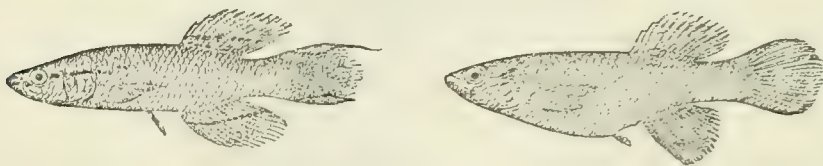
## 6. FUNDULUS GULARIS.

Bouleng. Proc. Zool. Soc. 1901, ii. p. 623, pl. xxxvii. figs. 2 & 3; Pellegr. Bull. Mus. Paris, 1907, p. 321; Paul Arnold, Bl. Aq. Terr. 1908, p. 585, pl. —. figs. 2 & 3; Trüber, op. cit. 1910, pp. 247, 469, figs., and 1911, p. 251; Stansch, Woch. Aq. Terr. 1911, p. 422, pl. —. fig.; Arnold, t. c. p. 463; M. Fischer, t. c. p. 501, fig.; Arnold, t. c. p. 603; Starkloff, Bl. Aq. Terr. 1913, p. 179.

Depth of body  $3\frac{1}{2}$  to  $4\frac{1}{2}$  times in total length, length of head  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times. Head flat above; snout short and broad, as long as eye; mouth directed upwards; lower jaw projecting; eye  $3\frac{3}{4}$  to  $4\frac{1}{4}$  times in length of head,  $1\frac{2}{3}$  to 2 times in interorbital width; space between eye and lip  $\frac{1}{4}$  to  $\frac{1}{3}$  diameter of former. Dorsal 15–16, originating at equal distance from head and from base of caudal, or a little nearer the former; longest rays  $\frac{2}{3}$  to once length of head. Anal 16–18, opposite

to dorsal, and similarly developed, sometimes divided by a notch in fully developed males. Pectoral  $\frac{3}{4}$  to once length of head, reaching beyond base of ventral, which is small and midway between end of snout and base of caudal in males, or a little nearer latter in females. Caudal rounded in female, more or less distinctly trilobate, with some of the rays produced, in male. Caudal peduncle a little longer than deep. 30–34 scales in longitudinal series, 24–26 round body in front of ventrals; lateral line indicated by a more or less distinct series of

Fig. 20.

*Fundulus gularis.*Types, ♂ ♀ (P. Z. S. 1901). figs.

pits. Yellowish-olive or olive-brown, with purplish-red markings, which, in the male, are large and form a band on each side of the head, which may be continued along the body, in addition to smaller spots and vermiculations, the band passing round to the other side over the lower jaw; a streak or a series of purple or crimson spots across the end of the pectoral and along the dorsal and anal, and usually two on the caudal; male with a median band of purplish red on the branchiostegal membrane. In a larger var. *cærulea* (var. A, Arnold), the body of the male is bluish with red vertical bars and the caudal is yellow in the middle and blue above and below.

Total length 105 millim.

Niger Delta, Cameroon.

1–6. Types.	Agberi.	Dr. W. J. Ansorge (P.).
7–16. Ad. & hgr.	„	„ (C.).
17–18, 19–20. Ad.	Warri.	Mr. J. Paul Arnold (P.).
21, 22–23, 24–27. Ad. & hgr.	Niger Delta.	„

## 7. FUNDULUS ARNOLDI.

Bouleng. Ann. & Mag. N. H. (8) ii. 1908, p. 29; Paul Arnold, Bl. Aq. Terr. 1908, p. 585, pl. —. fig. 1, and Woch. Aq. Terr. 1911, p. 602, fig.; Träber, Bl. Aq. Terr. 1912, p. 351, fig.

Depth of body  $4\frac{1}{2}$  to  $5\frac{1}{2}$  times in total length, length of head 3 to  $3\frac{1}{3}$

times. Head flat above; snout short and broad, a little shorter than eye; mouth directed upwards; lower jaw projecting; eye  $3\frac{1}{2}$  to 4 times in length of head,  $1\frac{1}{4}$  to  $1\frac{1}{3}$  times in interorbital width; space between eye and lip about  $\frac{1}{3}$  diameter of former. Dorsal 15–16, originating slightly in advance of anal, at nearly equal distance from eye and from root of caudal; longest (posterior) ray quite as long as head in male, shorter in female. Anal 15–17, similar to dorsal. Pectoral about  $\frac{2}{3}$  length of head, reaching base of ventral, which is small and nearly

Fig. 21.

*Fundulus arnoldi*.

Types, ♂ ♀.

midway between end of snout and base of caudal. Caudal rounded in female, with upper and lower rays much produced in male. Caudal peduncle much longer than deep. 25–27 scales in longitudinal series, 20–22 round body; an interrupted series of lateral-line pits. Pale olive, spotted or dotted with crimson on the head, body, and vertical fins; male with a dark band along the upper part of the dorsal and anal fins.

Total length 55 millim.

Niger Delta.

1–4. Types.	Warri.	Mr. J. Paul Arnold (P.).
5. Ad.	"	"
6. Ad.	Sapelle.	"

### 8. FUNDULUS PALMQUISTII.

Lönnb. Kilim.-Meru Exped., Fish. p. 7 (1907).

Depth of body  $3\frac{1}{2}$  times in total length, length of head  $2\frac{3}{4}$  to 3 times. Head flat above; snout broad, as long as or a little longer than eye; mouth directed upwards; lower jaw projecting; eye about 4 times in length of head and  $1\frac{2}{3}$  times in interorbital width; space between eye and lip about  $\frac{1}{4}$  diameter of former. Dorsal 16, originating about midway between eye and base of caudal; longest rays (in male) about  $\frac{5}{6}$  length of head. Anal 15, originating slightly behind origin of



dorsal, rays beset with short spines in the male. Pectoral about  $\frac{2}{3}$  length of head, reaching base of ventrals in the male. Caudal rounded. Caudal peduncle a little longer than deep. 27–28 scales in longitudinal series, 22 round body in front of ventrals; lateral line indicated by a series of shallow pits. Yellowish olive, uniform in the

Fig. 22.

*Fundulus palmquisti.*

♂, type.

female; in the male each scale with the posterior margin becoming a carmine-red band, these bands so connected as to form oblique transverse bands; dorsal and anal fins with carmine-red spots, which colour also occupies the whole of the caudal in the male.

Total length 40 millim.

Usambara, German East Africa.—Types in Stockholm Museum.

1–2. Types.

Tanga, Usambara.

Dr. Y. Sjöstedt (C.);

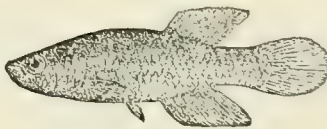
Prof. E. Lönnberg (P.).

#### 9. FUNDULUS WALKERI.

Bouleng. Ann. & Mag. N. H. (8) viii. 1911, p. 262.

Depth of body  $3\frac{2}{3}$  to 4 times in total length, length of head 3 to  $3\frac{1}{2}$  times. Head flat above; snout short and broad, a little shorter than eye; mouth directed upwards, lower jaw projecting; eye  $3\frac{1}{2}$  times

Fig. 23.

*Fundulus walkeri.*

Type.

in length of head, nearly twice in interorbital width; space between eye and lip very narrow, the latter forming an angle fitting into a notch close to the former. Dorsal 14, originating midway between occiput and root of caudal, posterior rays longest,  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head. Anal

15-16, originating slightly in advance of dorsal. Pectoral  $\frac{2}{3}$  length of head, reaching base of ventral; latter small, equally distant from end of snout and from root of caudal. Caudal rounded. Caudal peduncle as long as deep. 28-30 scales in longitudinal series, 22-24 round body in front of ventrals; lateral line indicated by a series of pits. Uniform brownish (badly preserved specimens).

Total length 42 millim.

Gold Coast.

1-3. Types.

Bokitsa Mine (Wasa).

R. B. N. Walker, Esq. (C.);

Dr. A. Günther (P.).

#### 10. FUNDULUS ORTHONOTUS.

*Cyprinodon orthonotus*, Peters, Mon. Berl. Ac. 1844, p. 35.

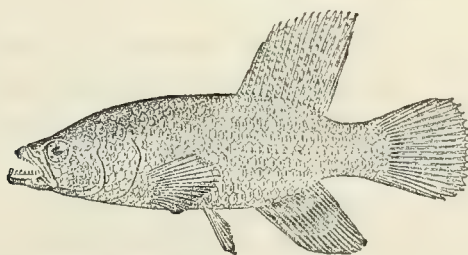
*Hydrargyra maculata*, Peters, Arch. f. Nat. 1855, i. p. 269.

*Fundulus orthonotus*, part., Günth. Cat. Fish. vi. p. 326 (1866).

*Nothobranchius orthonotus*, Peters, Reise Mossamb. iv. p. 61, pl. xii. fig. 1 (1868).

Depth of body 3 to  $3\frac{1}{2}$  times in total length, length of head  $2\frac{2}{3}$  to 3 times. Upper surface of head convex from between the eyes; snout short and broad, a little shorter than eye; mouth directed upwards; lower jaw projecting; eye 4 times in length of head,  $1\frac{2}{3}$  to  $1\frac{3}{4}$  times in interorbital width; space between eye and lip very narrow, the latter forming an angle fitting into a notch close to the former. Dorsal 15-16, originating midway between occiput and root of caudal, posterior

Fig. 24.



*Fundulus orthonotus*.

♂, type, after Peters (Reise Mossamb.).

rays longest, as long as head in male, shorter in female. Anal 14-16, opposite to dorsal. Pectoral  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head, reaching base of ventral or a little beyond; ventral small, nearer base of caudal than end of snout. Caudal rounded. Caudal peduncle as long as deep. 28-30

scales in longitudinal series, 24 round body in front of ventrals; lateral line indicated by a series of pits. Dark green above (in life), golden or yellowish white beneath; a dark brown transverse spot on each side; dorsal and anal fins greenish yellow and spotted with dark brown, edged with white in the male.

Total length 70 millim.

Mozambique.—Types in Berlin Museum.

1-2. Two of the types.

Quellimane.

Prof. W. Peters (P.).

3. Ad.

„

Sir J. Kirk (P.).

# 11. FUNDULUS MELANOSPILUS.

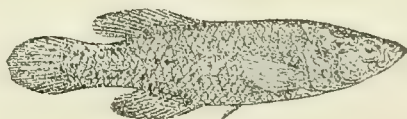
*Fundulus orthonotus*, part., Playf. & Günth. Fish. Zanz. p. 118, pl. xvii. fig. 3 (1866).

*Fundulus taniopygus*, part., Garman, Mem. Mus. Comp. Zool. xix. 1, 1895, p. 114.

*Fundulus melanospilus*, Pfeff. Thierw. O.-Afr., Fische, p. 48 (1896).

Depth of body  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times in total length, length of head 3 times. Snout short and broad, a little shorter than eye; mouth directed upwards; lower jaw projecting; eye 4 times in length of head,  $1\frac{2}{3}$  to

Fig. 25.



*Fundulus melanospilus*.

♀, type, after Playfair & Günther, *op. cit.*

$1\frac{3}{4}$  times in interorbital width; space between eye and lip very narrow, the latter forming an angle fitting into a notch close to the former. Dorsal 14-15, originating midway between occiput and root of caudal, longest rays about  $\frac{3}{5}$  length of head. Anal 17-18, opposite to dorsal. Pectoral  $\frac{2}{3}$  length of head, reaching base of ventral or a little beyond; ventral small, nearly equally distant from end of snout and from base of caudal. Caudal rounded. Caudal peduncle slightly longer than deep. 30-31 scales in longitudinal series, 22-24 round body in front of ventrals; lateral line indicated by a series of pits. Brownish, posterior part of body with black dots. Male unknown.

Total length 55 millim.

Seychelles.

1-5. Types.

Seychelles.

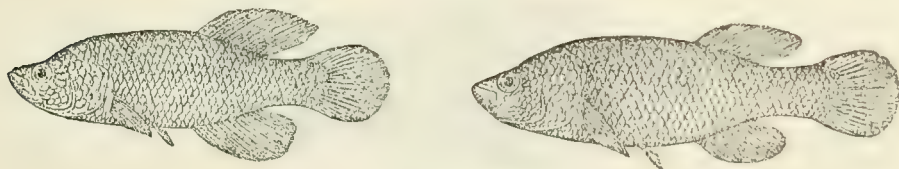
Sir L. Playfair (P.).

## 12. FUNDULUS NEUMANNI.

Hilgend. Zool. Jahrb., Syst. xxii. 1905, p. 417.

Depth of body equal to length of head, 3 times in total length. Upper surface of head convex from between the eyes; snout short and broad, as long as or a little shorter than eye; mouth directed upwards; lower jaw projecting; eye 4 times in length of head,  $1\frac{3}{4}$  times in inter-orbital width; space between eye and lip very narrow, the latter forming an angle fitting into a notch close to the former. Dorsal 15–16, originating midway between occiput and root of caudal, posterior rays longest,  $\frac{2}{3}$  length of head in male,  $\frac{1}{2}$  in female. Anal 16–17, opposite to dorsal. Pectoral about  $\frac{3}{5}$  length of head, nearly reaching base of ventral or a little beyond; ventral small, midway between end of snout and base of caudal. Caudal rounded. Caudal

Fig. 26.



*Fundulus neumanni*.

♂ ♀, types.

peduncle as long as deep, or slightly longer than deep. 30–32 scales in longitudinal series, 32–36 round body in front of ventrals; no indication of lateral line. Uniform brownish yellow; male with some carmine spots on the head and some reddish on the caudal.

Total length 60 millim.

German East Africa.—Types in Berlin Museum.

1–3. Three of the types.

North Ugogo.

Prof. O. Neumann (C.).

## 13. FUNDULUS GUENTHERI.

*Fundulus orthonotus*, part., Playf. & Günth. Fish. Zanz. p. 118, pl. xvii. fig. 2 (1866).

*Nothobranchius orthonotus* (non Peters), Hilgend. Sitzb. Ges. nat. Fr. Berl. 1891, p. 19.

*Fundulus guentheri*, Pfeff. Jahrb. Hamb. Wiss. Anst. x. 2, 1893, p. 39, and Thierw. O.-Afr., Fische, p. 39 (1896).

*Fundulus taniopygus*, part., Garm. Mem. Mus. Comp. Zool. xix. 1, 1895, p. 114.

Depth of body nearly equal to length of head,  $2\frac{3}{4}$  to  $3\frac{1}{4}$  times in total



length. Upper surface of head convex from between the eyes; snout short and broad, a little shorter than eye; mouth directed upwards; lower jaw projecting; eye 4 times in length of head,  $1\frac{2}{3}$  to 2 times in interorbital width; space between eye and lip very narrow, the latter forming an angle fitting into a notch close to the former. Dorsal 17-18, originating midway between occiput and root of caudal, posterior rays longest,  $\frac{3}{4}$  to  $\frac{5}{6}$  length of head in male, about  $\frac{2}{3}$  in female. Anal 18-19, opposite to dorsal. Pectoral  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head, reaching base of ventral or a little beyond; ventral small, midway between end of snout and base of caudal. Caudal rounded. Caudal peduncle as long as deep, or slightly longer than deep. 27-30 scales in longitudinal series, 24-28 round body in front of ventrals; lateral line indicated by a

Fig. 27.

*Fundulus guentheri.*♂, type, after Playfair & Günther, *l. c.*

more or less distinct series of pits. Brown, lighter beneath, males with a more or less distinct dark brown or carmine-red margin to the scales; dorsal and anal of male dark, with fine light oblique streaks or with red spots; caudal of male usually carmine-red, or red edged with blackish, or red in the basal half and blackish in the distal.

Total length 68 millim.

Zanzibar Island and opposite coast of East Africa, from Mombasa to the Pangani River.

1-2, 3. Types.	Zanzibar.	Sir L. Playfair (P.).
4-5. Ad.	„	Mr. G. Schröder (P.).
6-8. Ad.	„	Mr. J. Paul Arnold (P.).
9-13. Ad.	Pangani R.	Sir L. Playfair (P.).
14-25, 26-29. Ad. & hgr.	Mombasa.	D. J. Wilson, Esq. (C.).
30. Skel.	„	„

## 14. FUNDULUS TÆNIOPYGUS.

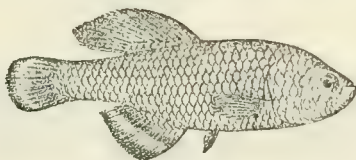
*Fundulus* (*Nothobranchius*) *orthonotus*, var., Hilgend. Sitzb. Ges. nat. Fr. Berl. 1888, p. 78.

*Nothobranchius tæniopygus*, Hilgend. op. cit. 1891, p. 20.

*Fundulus tæniopygus*, Pfeff. Thierw. O.-Afr., Fische, p. 48 (1896) ; Hilgend. Zool. Jahrb., Syst. xxii. 1905, p. 416 ; Bouleng. Fish. Nile, p. 413, pl. lxxix. fig. 5 (1907).

Depth of body  $3\frac{3}{4}$  times in total length, length of head 3 to  $3\frac{1}{2}$  times. Upper surface of head convex from between the eyes ; snout short and broad ; mouth directed upwards ; lower jaw projecting ; eye  $3\frac{1}{2}$  times in length of head,  $1\frac{1}{2}$  times in interorbital width ; space between eye and lip very narrow, the latter forming an angle fitting into a notch close to the former. Dorsal 17, originating a little in advance of anal and at

Fig. 28.

*Fundulus tæniopygus*.

♂, type (F. N.).

equal distance from eye and from root of caudal, longest rays  $\frac{3}{5}$  to  $\frac{3}{4}$  length of head. Anal 17–18. Small spine-like tubercles on the dorsal and anal in the male. Pectoral about  $\frac{3}{5}$  length of head ; ventral midway between end of snout and root of caudal. Caudal rounded. Caudal peduncle  $1\frac{1}{3}$  times as long as deep. 30–31 scales in longitudinal series, 22–24 round body in front of ventrals ; lateral line indicated by an interrupted series of pits. Male brown, with dark edges to the scales ; dorsal fin dark purplish brown ; anal and caudal purplish brown, with a whitish band across the middle. Female lighter and uniformly coloured.

Total length 52 millim.

Lake Victoria, Lake Tshaya in Unyamwesi, and Bubu River, south of Lake Manyara.—Types in Berlin Museum.

1–3. Ad.

Bubu R. near Irango.

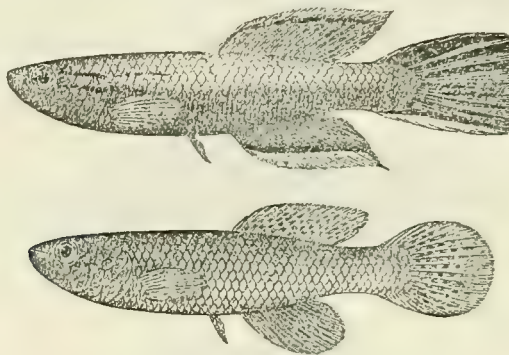
Prof. O. Neumann (C.).

15. *FUNDULUS SJOESTEDTI*.

Lönnberg, Öfv. Ak. Förh. Stockh. 1895, p. 191; Rachow, Bl. Aq. Terr. 1911, p. 101, fig.; Träber, t. c. p. 669, fig.; Arnold, Woch. Aq. Terr. 1911, p. 137, fig.

Depth of body 4 to  $4\frac{1}{2}$  times in total length, length of head  $3\frac{1}{2}$  to  $3\frac{3}{4}$  times. Head flat above; snout short and broad, as long as eye; mouth directed upwards; lower jaw projecting; eye  $3\frac{1}{2}$  to 4 times in length of head, nearly twice in interorbital width; space between eye and lip very narrow, the latter forming an angle fitting into a notch close to the former. Dorsal 17–19, originating at equal distance from eye and from

Fig. 29.

*Fundulus sjoestedti*.

♂ ♀. Calabar.

base of caudal; longest (posterior) rays  $\frac{2}{3}$  to  $\frac{5}{6}$  length of head. Anal 17–19, originating opposite or a little behind origin of dorsal. Pectoral  $\frac{2}{3}$  length of head, hardly reaching base of ventral, which is small and midway between end of snout and base of caudal. Caudal rounded in female, truncate, with or without some of the middle rays produced into filaments in male. Caudal peduncle a little longer than deep. 33–36 scales in longitudinal series, 26–30 round body in front of ventrals. Brownish, male with bright carmine-red markings, with few oblique bands and streaks on the sides of the head, and spots and vertical bars on the body; a red band round the chin; upper half of caudal dark purplish or with longitudinal red bands, lower half whitish, partly streaked, partly spotted, or with an oblique red band with purplish outer edge; a bright carmine-red band along the dorsal, which, like the anal, may also be spotted with red.

Total length 70 millim.

Coast of Guinea to Cameroon.—Types in Stockholm Museum.

1-5. Ad.	Nyong R. at Akonolinga, S. Cameroon.	G. L. Bates, Esq. (C.).
6-9. Ad.	Calabar.	Mr. J. Paul Arnold (P.).
10-11. Ad.	Sherboro.	"
12-13. Hgr.	Axim, Gold Coast.	Mr. A. Rachow (P.).

## 16. FUNDULUS MICROLEPIS.

Vincig. Ann. Mus. Genova, (2) xvii. 1897, p. 356.

Depth of body nearly equal to length of head, 3 to  $3\frac{1}{4}$  times in total length. Head flat above, as deep as broad; mouth directed upwards; lower jaw projecting; snout 3 to  $3\frac{1}{2}$  times in length of head; eye  $5\frac{4}{5}$  to 6 times in length of head,  $2\frac{2}{5}$  to  $2\frac{1}{2}$  times in interorbital width. Dorsal 16-17, originating a little nearer head than root of caudal. Anal 17-18, opposite to dorsal. Pectoral reaching ventral, or a little beyond. Caudal subtruncate. 40-42 scales in longitudinal series, 26-28 in transverse series. Yellowish grey; a black band from one angle of the mouth to the other, passing through the eyes and over the nape.

Total length 65 millim.

Between Brava and Lugh, Somaliland.—Types in Genoa Museum.

## 17. FUNDULUS NISORIUS.

Cope, Proc. Amer. Philos. Soc. xi. 1871, p. 456.

Depth of body  $3\frac{2}{3}$  times in total length, length of head 4 times. Eye 4 times in length of head and twice in interorbital width. Dorsal 12. Anal 10-11, originating about opposite to middle of dorsal. Scales 36 in longitudinal series, 12 in transverse series. Light brown, male faintly cross-banded.

Total length 100 millim.

Gaboon.—Types in Museum of Academy of Philadelphia.

## 18. FUNDULUS CAPENSIS.

Garman, Mem. Mus. Comp. Zool. xix. 1, 1895, p. 113.

Head broad, depressed, crown flat; snout short, rounded; eye nearly twice length of snout,  $2\frac{1}{2}$  times in length of head, little less than interorbital width. Dorsal 13, originating midway between centre of eye and base of caudal, and slightly in advance of vent. Anal 13, originating



below middle of dorsal. Caudal rounded. Scales 36 in longitudinal series, 11 in transverse series. Olivaceous, edges of scales darker; top of head darker, crossed by a lighter band in front of the eye; opercle silvery, crossed by a darkish streak behind the eye; a faint band of silvery from the opercle to the caudal along the middle of the side; 5 or 6 broad blotches of brownish across the flanks, separated by rather wider spaces of the lighter colour; a vertebral darkish streak, more distinct behind the dorsal; a similar line between anal and lower edge of caudal; a band crosses the caudal near its base.

Total length 26 millim.

False Bay, Cape of Good Hope.—Type in Museum of Comp. Zoology, Cambridge, Mass.

#### 4. HAPLOCHILUS.

McClell. Asiat. Res. xix. pp. 301 & 426 (1839); Günth. Cat. Fish. v. p. 310 (1866); Bouleng. Poiss. Bass. Congo, p. 344 (1901), and Fish. Nile, p. 415 (1907).

*Epiplatys*, Gill, Proc. Ac. Philad. 1862, p. 136.

*Atopocheilichthys*, Bleek. Nat. Verh. Vet. Haarlem, xviii. 1863, no. 2, p. 116.

*Lycocyprinus*, Peters, Mon. Berl. Ac. 1868, p. 146.

Distinguished from the preceding genus by the more posterior position of the dorsal fin, the origin of which is well behind that of the anal.

Fresh and brackish waters of Africa, Southern and Eastern Asia, Central and South America, and the West Indies.

#### *Synopsis of the Species.*

I. Dorsal 10–13 \*; scales 27–34 in a longitudinal series.

A. Eye  $2\frac{1}{2}$  to 3 times in length of head.

- D. 10–11; A. 14–15; Sc. 28–31; middle dorsal and anal rays longest; caudal peduncle 2 to  $2\frac{1}{2}$  times as long as deep . 1. *H. antinorii*, Vincig., p. 44.
- D. 10; A. 14–15; Sc. 27–28; middle dorsal and anal rays longest; caudal peduncle  $1\frac{1}{3}$  times as long as deep . . . . . 2. *H. myaposaë*, Blgr., p. 44.
- D. 10–11; A. 14–15; Sc. 27–29; posterior dorsal and anal rays longest; caudal peduncle 1 to  $1\frac{1}{3}$  times as long as deep . 3. *H. pumilus*, Blgr., p. 45.

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\* See also species 19 to 21 and 29 and 34 in division II. of this synopsis.

- D. 10-11; A. 14-15; Sc. 32-36; posterior dorsal and anal rays longest; caudal peduncle  $1\frac{2}{3}$  to twice as long as deep . . . 4. *H. christyi*, Blgr., p. 46.
- B. Eye  $3\frac{1}{4}$  to 4 times in length of head.
1. Caudal peduncle  $1\frac{1}{2}$  to 2 times as long as deep.
- D. 10; A. 13-14; Sc. 30-32; depth of body 6 to  $6\frac{1}{2}$  times in total length; caudal rounded or subacuminate . . . . . 5. *H. ferranti*, Blgr., p. 47.
- D. 11-12; A. 14-15; Sc. 30-34; depth of body  $4\frac{1}{2}$  to  $5\frac{1}{2}$  times in total length; caudal subacuminate . . . . . 6. *H. cameronensis*, Blgr., p. 47.
- D. 11; A. 15-16; Sc. 32-33; depth of body  $5\frac{1}{2}$  to 6 times in total length; caudal rounded. . . . . 7. *H. liberiensis*, Blgr., p. 48.
- D. 10-11; A. 14-15; Sc. 29-32; depth of body 4 to 5 times in total length; caudal rounded, with upper and lower rays produced in males . . . . . 8. *H. lujæ*, Blgr., p. 49.
2. Caudal peduncle not longer than deep.
- a. Caudal rounded.
- D. 11; A. 14; Sc. 28; pectoral  $\frac{3}{8}$  length of head . . . . . 9. *H. homalonotus*, A. Dum., p. 50.
- D. 10; A. 13; Sc. 30 . . . . . 10. *H. nuchimaculatus*, Guichen., [p. 50.
- D. 12-13; A. 17-19; Sc. 29-32; pectoral  $\frac{1}{2}$  to  $\frac{3}{8}$  length of head . . . . . 11. *H. playfairii*, Gthr., p. 51.
- D. 11-12; A. 16-18; Sc. 27-29; pectoral  $\frac{3}{8}$  to  $\frac{3}{4}$  length of head . . . . . 12. *H. fasciolatus*, Gthr., p. 52.
- b. Caudal acuminate or rounded-subacuminate.
- D. 11; A. 16; Sc. 30-31; caudal acutely pointed . . . . . 13. *H. ansorgii*, Blgr., p. 53.
- D. 10-12; A. 15-17; Sc. 28-32; caudal rounded-subacuminate . . . . . 14. *H. sexfasciatus*, Gill, p. 54.
- II. Dorsal 6-10; scales 23-32 in a longitudinal series.
- A. Dorsal originating above middle of anal, rarely further back\*.
1. Eye considerably shorter than postocular part of head.
- a. 24-28 scales in longitudinal series.
- D. 7-8; A. 14-15; Sc. 25-27; caudal rounded or rounded-acuminate; caudal peduncle not longer than deep . . . . . 15. *H. chaperi*, Sauv., p. 56.

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\* *H. kingii*, p. 64.

D. 8-9; A. 13-14; Sc. 24-26; caudal rounded-acuminate; caudal peduncle  $1\frac{1}{2}$  times as long as deep . . . . . 16. *H. decorsii*, Pellegr., p. 57.

D. 8; A. 12; Sc. 28; caudal rounded; caudal peduncle  $1\frac{1}{2}$  times as long as deep . . . 17. *H. exiguus*, Blgr., p. 57.

b. 29-32 scales in longitudinal series.

D. 8; A. 14-15; Sc. 30-32; caudal forked in the male; caudal peduncle nearly twice as long as deep . . . . . 18. *H. elegans*, Blgr., p. 58.

D. 9-10; A. 14-15; Sc. 30-32; caudal rounded; caudal peduncle a little longer than deep . . . . . 19. *H. petersii*, Sauv., p. 59.

D. 9-10; A. 12-13; Sc. 29-30; caudal acuminate or rounded-acuminate; interorbital width 2 diameters of eye, which is  $3\frac{2}{3}$  to 4 times in length of head . . . 20. *H. calliurus*, Blgr., p. 59.

D. 9-10; A. 13; Sc. 30-31; caudal rounded; interorbital width  $1\frac{1}{2}$  diameters of eye, which is  $3\frac{1}{3}$  times in length of head . . 21. *H. striatus*, Blgr., p. 60.

2. Eye not more than 3 times in length of head, not or but slightly shorter than postocular part of head.

a. Caudal rounded.

a. Caudal peduncle not longer than deep; ventral nearer end of snout than caudal.

D. 7-8; A. 13-14; Sc. 25-28; lower jaw not projecting . . . . . 22. *H. spilauchen*, A. Dum., p. 61.

D. 8-9; A. 13-15; Sc. 23-24; lower jaw projecting . . . . . 23. *H. hutereaui*, Blgr., p. 63.

β. Caudal peduncle longer than deep; lower jaw projecting.

\* Ventral equally distant from end of snout and from caudal.

D. 7-8; A. 14-15; Sc. 24-28 . . . . . 24. *H. loati*, Blgr., p. 63.

D. 6-7; A. 11-12; Sc. 26-27 . . . . . 25. *H. kingii*, Blgr., p. 64.

\*\* Ventral much nearer end of snout than caudal.

D. 7-8; A. 12-13; Sc. 25-28; caudal peduncle  $1\frac{1}{2}$  to 2 times as long as deep; diameter of eye much less than interorbital width . . . . . 26. *H. schoelleri*, Blgr., p. 65.

D. 7-8; A. 14-16; Sc. 26-28; caudal peduncle twice as long as deep; diameter of eye a little less than interorbital width . . . . . 27. *H. moeruensis*, Blgr., p. 66.

D. 7-8 ; A. 12-14 ; Sc. 24-27 ; caudal peduncle not much longer than deep ; diameter of eye a little less than inter-orbital width . . . . . 28. *H. macrurus*, Blgr., p. 67.

D. 9-10 ; A. 14-15 ; Sc. 25-27 . . . . . 29. *H. katangæ*, Blgr., p. 67.

*b.* Caudal truncate.

D. 8-9 ; A. 14-15 ; Sc. 29-31. . . . . 30. *H. cabindæ*, Blgr., p. 68.

B. Dorsal originating above posterior third or fourth of anal.

1. Caudal rounded or very obtusely pointed, not or but slightly longer than head.

D. 7-8 ; A. 13-14 ; Sc. 28-29 ; ventral much nearer end of snout than caudal . . . . 31. *H. johnstonii*, Gthr., p. 69.

D. 6-7 ; A. 14-15 ; Sc. 27-28 ; ventral equally distant from end of snout and from caudal . . . . . 32. *H. marni*, Stdr., p. 70.

D. 8-9 ; A. 15-16 ; Sc. 26-29 ; ventral nearly equally distant from end of snout and from caudal, or a little nearer latter . . 33. *H. senegalensis*, Stdr., p. 71.

2. Caudal pointed, not longer than head. [p. 72.]

D. 9-10 ; A. 15-16 ; Sc. 26-29 . . . . . 34. *H. aculicaudatus*, Pellegr.,

3. Caudal rounded-subacuminate, longer than head.

D. 8-9 ; A. 15-16 ; Sc. 28-29 ; ventral at least  $\frac{1}{2}$  length of head . . . . . 35. *H. longiventralis*, Blgr., p. 72.

D. 8-9 ; A. 15-16 ; Sc. 28-30 ; ventral not  $\frac{1}{2}$  length of head . . . . . 36. *H. macrostigma*, Blgr., p. 73.

4. Caudal pointed, longer than head.

D. 9 ; A. 15 ; Sc. 28-29, 20 round body in front of ventrals ; depth of body  $4\frac{1}{2}$  to  $4\frac{2}{3}$  times in total length . . . . . 37. *H. nigricans*, Blgr., p. 74.

D. 8-9 ; A. 14-15 ; Sc. 29-30, 20 round body ; depth of body 5 to  $5\frac{1}{4}$  times in total length . . . . . 38. *H. multifasciatus*, Blgr., p. 75.

D. 7-8 ; A. 15-16 ; Sc. 28-30, 20-22 round body ; depth of body 4 to  $4\frac{1}{2}$  times in total length . . . . . 39. *H. grahami*, Blgr., p. 75.

D. 6-7 ; A. 15-16 ; Sc. 27-28, 16-18 round body . . . . . 40. *H. bifasciatus*, Stdr., p. 76.

D. 7-8 ; A. 13-14 ; Sc. 27-28. . . . . 41. *H. chevalieri*, Pellegr., p. 77.

5. Caudal notched in males.

D. 8 ; A. 14 ; Sc. 27-28 . . . . . 42. *H. singa*, Blgr., p. 78.



## 1. HAPLOCHILUS ANTINORII.

Vincig. Ann. Mus. Genova, xviii. 1883, p. 693, fig.; Bouleng. P. Z. S. 1903, ii. p. 333.

Depth of body 4 to  $4\frac{1}{2}$  times in total length, length of head 3 to  $3\frac{2}{3}$  times. Head flat above; snout short, much shorter than eye; mouth directed upwards, lower jaw strongly projecting; eye  $2\frac{2}{3}$  to 3 times in length of head,  $1\frac{1}{3}$  times in interorbital width, a little shorter than post-ocular part of head; præorbital about  $\frac{1}{4}$  diameter of eye. Dorsal 10–11, originating at equal distance from head and from root of caudal, above anterior third of anal, median rays longest,  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head. Anal 14–15, rounded like the dorsal. Pectoral  $\frac{3}{4}$  length of head, reaching a little beyond base of ventral; latter small, nearer end of snout than

Fig. 30.

*Haplochilus antinorii.*

♂, type.  $\frac{4}{3}$ .

root of caudal. Caudal rounded, as long as or a little shorter than head. Caudal peduncle 2 to  $2\frac{1}{2}$  times as long as deep. 28–31 scales in longitudinal series, 20–22 round body in front of ventrals; no lateral-line pits. Yellowish, speckled with brown, or with the dorsal scales edged with brown; dark dots often forming lines above, below, and on the sides of the caudal region; fins uniform whitish.

Total length 30 millim.

Southern Ethiopia and Lake Naiwasha.—Types in Genoa Museum.

1–2. Two of the types.	L. Arsadé, Adda Gallaland.	Marquis O. Antinori (C.); Genoa Museum (P.).
3. Ad.	Suksuk R., near L. Zwai.	Prof. O. Neumann and Baron C. von Erlanger (C.).
4–9. Ad.	L. Naiwasha.	R. J. Cunninghame, Esq. (P.).
10–40. Ad. & hgr.	Nairobi.	Sir F. J. Jackson (P.).

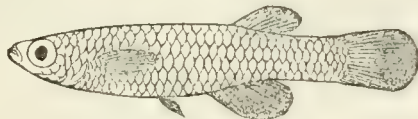
## 2. HAPLOCHILUS MYAPOSÆ.

Bouleng. Ann. Natal Mus. i. 1908, p. 232, fig.

Depth of body 4 to  $4\frac{1}{2}$  times in total length, length of head  $3\frac{2}{3}$  to 4 times. Head flat above; snout short and broad, shorter than eye;

mouth directed upwards, lower jaw projecting; eye nearly 3 times in length of head,  $1\frac{1}{2}$  times in interorbital width, as long as or a little shorter than postorbital part of head; præorbital hardly  $\frac{1}{3}$  diameter of eye. Dorsal 10, originating twice as far from anterior border of eye as from root of caudal, above anterior third of anal, median rays longest, about  $\frac{1}{2}$  length of head. Anal 14–15, rounded like the dorsal. Pectoral  $\frac{3}{4}$  length of head, reaching a little beyond base of ventral; latter nearer

Fig. 31.

*Haplochilus myaposa.*

Type (Ann. Natal Mus. 1908).

end of snout than root of caudal. Caudal rounded, as long as head. Caudal peduncle  $1\frac{1}{3}$  times as long as deep. 27–28 scales in longitudinal series, 16 round body in front of ventrals; no lateral-line pits. Pale olive, with darker edges to the scales; fins greyish.

Total length 28 millim.

Zululand.—Types in Natal Museum, Pietermaritzburg.

1–2. Two of the types.

Myaposa R.

Dr. E. Warren (P.).

### 3. HAPLOCHILUS PUMILUS.

Bouleng. Tr. Zool. Soc. xvii. 1906, p. 554, pl. xxxii. fig. 4, and Fish. Nile, p. 420, pl. xxxii. fig. 4 (1907).

Depth of body  $3\frac{2}{3}$  to  $4\frac{1}{2}$  times in total length, length of head  $3\frac{1}{2}$  to 4 times. Head flat above; snout short and broad, shorter than eye;

Fig. 32.

*Haplochilus pumilus.*

Type (F. N.).  $\frac{3}{2}$ .

mouth directed upwards, lower jaw strongly projecting; eye nearly 3 times in length of head,  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times in interorbital width,  $\frac{2}{3}$  to  $\frac{3}{4}$  postorbital part of head; præorbital hardly  $\frac{1}{3}$  diameter of eye. Dorsal 10–11, originating twice as far from snout or eye as from root of caudal,

above anterior third of anal; posterior rays longest,  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Anal 14–15, pointed like the dorsal. Pectoral  $\frac{2}{3}$  length of head, reaching beyond base of ventral; latter nearer end of snout than root of caudal. Caudal rounded, nearly as long as head. Caudal peduncle 1 to  $1\frac{1}{3}$  times as long as deep. 27–29 scales in longitudinal series, 16–18 round body in front of ventrals; no lateral-line pits. Yellowish, more brownish on the back, where the scales have darker outlines; a dark lateral streak sometimes present; fins greyish or purplish.

Total length 55 millim.

Lakes Tanganyika and Victoria.

1–3. Types.	Kitutu, L. Tanganyika.	Dr. W. A. Cunnington (C.).
4–5. Ad.	Sambala R., L. Tanganyika.	Dr. L. Stappers (C.).
6–11. Ad. & hgr.	Lufuko R.,                    "	"
12–21. Types.	Entebbe, L. Victoria.	Mr. E. Degen (C.).
22. Ad.	Sesse Ids.,                   "	Dr. E. Bayon (C.); Genoa Museum (P.).

#### 4. HAPLOCHILUS CHRISTYI, sp. n.

Depth of body 4 to  $4\frac{2}{3}$  times in total length, length of head  $3\frac{3}{4}$  to 4 times. Head flat above; snout broad, rounded, shorter than eye; mouth directed upwards; lower jaw slightly projecting; eye  $2\frac{2}{3}$  to 3 times in length of head, about  $1\frac{1}{2}$  times in interorbital width; præ-orbital very narrow. Dorsal 10–11, originating twice as far from eye as from root of caudal, above middle of anal; posterior rays longest, as long as or a little longer than head in male, shorter in female. Anal 14–15. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not reaching base of ventral; latter small, equally distant from end of snout and from root of caudal, or a little nearer former. Caudal rounded, as long as head in female, a little longer in male. Caudal peduncle  $1\frac{2}{3}$  to 2 times as long as deep. 32 to 34 scales in longitudinal series, 22–24 round body in front of ventrals; lateral line represented by a more or less distinct series of shallow pits. Yellowish or pale olive above, the scales edged with darker; male with more or less numerous carmine spots, these spots absent or very small in the female; fins of male with round carmine spots, caudal with an upper and a lower carmine edge.

Total length 50 millim.

Lindi River, Congo.—Types in Congo Museum, Tervueren.

1–10. Types.	Lindi R.	Dr. C. Christy (C.).
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## 5. HAPLOCHILUS FERRANTI.

Bouleng. Bull. Soc. Nat. Luxemb. 1910, p. 285.

Depth of body 6 to  $6\frac{1}{2}$  times in total length, length of head  $3\frac{2}{3}$  to 4 times. Head flat above; snout broad, rounded, a little shorter than eye; mouth directed upwards, lower jaw projecting; eye  $3\frac{1}{2}$  times in length of head,  $1\frac{2}{3}$  times in interorbital width; præorbital very narrow. Dorsal 10, originating twice as far from centre of eye or end of snout as from root of caudal, above middle of anal, longest ray about  $\frac{1}{2}$  length of head. Anal 13-14. Pectoral nearly  $\frac{3}{4}$  length of head, not reaching

Fig. 33.



*Haplochilus ferranti*.

♂, type.

ventral; latter small, equally distant from end of snout and from root of caudal. Caudal rounded or subacuminate, as long as head. Caudal peduncle  $1\frac{2}{3}$  times as long as deep. 30-32 scales in longitudinal series, 20 round body in front of ventrals; lateral line indicated by a series of shallow pits. Brown above and on the sides, dirty white beneath; usually a bright yellow, continuous or interrupted lateral band, from the gill-cover to the base of the caudal; dorsal and caudal brown, spotted with yellow; some orange on the pectoral and ventrals.

Total length 50 millim.

Kasai, Congo.—Types in Luxemburg Museum.

1. One of the types.

Kondue, Kasai.

M. E. Luja (C.).

2-3, 4-9. Ad.

" "

"

## 6. HAPLOCHILUS CAMERONENSIS.

Bouleng. Ann. & Mag. N. H. (7) xii. 1903, p. 440.

Depth of body  $4\frac{1}{2}$  to  $5\frac{1}{2}$  times in total length, length of head  $3\frac{2}{3}$  to 4 times. Head flat above; snout broad, rounded, a little shorter than eye; mouth directed upwards, lower jaw slightly projecting; eye  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times in length of head,  $1\frac{2}{3}$  to 2 times in interorbital width; præorbital very narrow. Dorsal 11-12, originating twice as far from centre



or anterior border of eye as from root of caudal, above middle of anal; longest rays a little shorter than head in male, about  $\frac{2}{3}$  length of head in female. Anal 14–15. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, reaching base of ventrals in male, not in female; ventral small, a little nearer end of snout than root of caudal. Caudal rounded-acuminate, as long as head in female, a little longer in male. Caudal peduncle  $1\frac{2}{3}$  to 2 times as

Fig. 34.

*Haplochilus cameronensis.*

♂ ♀, types.

long as deep. 30–34 scales in longitudinal series, 20–22 round body in front of ventrals; lateral line represented by a more or less distinct series of shallow pits. Yellowish or olive-brown, with carmine spots, which are more profusely distributed in males, in which they often form two longitudinal bands, one close to the lower outline, from below the pectoral to the root of the caudal, the other on the upper border of the caudal peduncle; fins grey, more or less spotted with carmine; in males, anal edged with black and white and lower border of caudal white.

Total length 55 millim.

South Cameroon, Fernando Po, Gaboon, Lower Congo.

1–2, 3–8. Types.	Kribi R., S. Cameroon.	G. L. Bates, Esq. (C.).
9–15. Ad. & hgr.	„ „	„
16–35. „ „	Nyong R., „	„
36. Type.	Ja R., „	„
37–38. Ad.	Fernando Po.	Mr. E. Seimund (C.).
39–40, 41–42. Ad.	Cape Lopez, Gaboon.	Mr. J. Paul Arnold (P.).
43–44. Ad.	Kwikenga, Manyanga, Congo.	Congo Museum (P.).

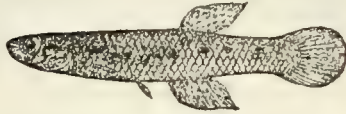
#### 7. HAPLOCHILUS LIBERIENSIS.

Bouleng. Ann. & Mag. N. H. (8) ii. 1908, p. 30.

Depth of body  $5\frac{1}{2}$  to 6 times in total length, length of head 4 times. Head flat above; snout broad, rounded, a little shorter than eye; mouth directed upwards, lower jaw projecting a little; eye  $3\frac{1}{2}$  times in length of head,  $1\frac{3}{5}$  to  $1\frac{2}{3}$  times in interorbital width; præorbital  $\frac{1}{4}$  to  $\frac{1}{3}$  diameter

of eye. Dorsal 11, originating at equal distance from head and from root of caudal, above anterior third (fourth or fifth ray) of anal; longest ray about  $\frac{2}{3}$  length of head (♀). Anal 15–16. Pectoral about  $\frac{2}{3}$  length of head, not reaching ventral; latter equally distant from end of snout and from root of caudal. Caudal rounded, nearly as long as head. Caudal peduncle twice as long as deep. 32–33 scales in longitudinal series,

Fig. 35.

*Haplochilus liberiensis.*♀, type.  $\frac{4}{3}$ .

20 round body in front of ventrals; an interrupted series of lateral-line pits. Yellowish to dark olive, with darker blotches; dorsal and anal fins with small blackish spots.

Total length 36 millim.

Liberia.

1–2. Types.

Monrovia.

Mr. J. Paul Arnold (P.).

3. Ad.

„

„

#### 8. HAPLOCHILUS LUJÆ.

Bouleng. Ann. & Mag. N. H. (8) viii. 1911, p. 263, and Bull. Soc. Nat. Luxemb. 1911, p. 223.

Depth of body 4 to 5 times in total length, length of head  $3\frac{1}{2}$  to 4 times. Head flat above; snout broad, rounded, a little shorter than eye; mouth directed upwards, lower jaw projecting; eye  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times in length of head,  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times in interorbital width; præ-orbital very narrow. Dorsal 10–11, originating twice as far from centre or anterior border of eye as from root of caudal, above middle of anal; longest ray about as long as head in male, about  $\frac{2}{3}$  length of head in female. Anal 14–15. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not reaching ventral; latter small, equally distant from end of snout and from root of caudal. Caudal rounded, as long as head, with one of the upper and one of the lower rays more or less produced in the male. Caudal peduncle  $1\frac{2}{3}$  to 2 times as long as deep. 29–32 scales in longitudinal series, 20–22 round body in front of ventrals; lateral line represented by a more or less distinct series of pits. Male olive above,

yellowish beneath, with numerous, rather large carmine spots disposed irregularly; dorsal fin with small round purple spots; anal and caudal with large purple markings, which may form streaks in the direction of the rays. Female yellowish, the scales of the upper parts edged

Fig. 36.

*Haplochilus lujae*.

♂ &amp; ♀, types.

with olive-brown; small red or orange spots sometimes present on the sides; dorsal, anal, and caudal with small purplish-brown spots.

Total length 45 millim.

Kasai, Congo.—Types in Luxemburg Museum.

1-6. Types.

Kondue, Sankun R.

M. E. Luja (C.).

#### 9. HAPLOCHILUS HOMALONOTUS.

*Pœcilia omalonota*, A. Dum. Arch. Mus. x. 1861, p. 257, pl. xxii. fig. 7.

*Haplochilus homalonotus*, Sauv. Hist. Madag., Poiss. p. 485, pl. xlvii. fig. 2 (1891).

Depth of body nearly 5 times in total length, length of head  $3\frac{1}{2}$  to 4 times. Head flat above; snout short and broad, as long as eye; mouth directed upwards; lower jaw strongly projecting; eye  $3\frac{1}{2}$  to 4 times in length of head; præorbital very narrow. Dorsal 11, originating twice as far from head as from root of caudal, above middle of anal, longest ray about  $\frac{1}{2}$  length of head. Anal 14. Pectoral  $\frac{2}{3}$  length of head, reaching ventral; latter equally distant from end of snout and from root of caudal. Caudal rounded, shorter than head. Caudal peduncle not longer than deep. 28 scales in longitudinal series. Uniform reddish brown.

Total length 95 millim.

Nossi Bé, Madagascar.—Types in Paris Museum.

#### 10. HAPLOCHILUS NUCHIMACULATUS.

*Pœcilia nuchimaculata*, Guichen. Mém. Soc. Sc. Nat. Cherb. xii. 1866, p. 144.

*Haplochilus nuchimaculatus*, Sauv. Hist. Madag., Poiss. p. 486, pl. xli. b. fig. 1 (1891).

Depth of body about 4 times in total length, length of head  $3\frac{1}{2}$  times.

Head flat above; lower jaw slightly projecting; eye  $3\frac{1}{2}$  times in length of head,  $1\frac{1}{2}$  times in interorbital width. Dorsal 10, originating twice as far from head as from root of caudal, above middle of anal, longest rays about  $\frac{2}{3}$  length of head. Anal 13. Pectoral widely separated from ventral; latter small, nearer root of caudal than end of snout. Caudal rounded, shorter than head. Caudal peduncle not longer than deep. 30 scales in longitudinal series. Greenish brown above, whitish beneath; fins yellowish; dorsal and anal with brown dots.

Total length 64 millim.

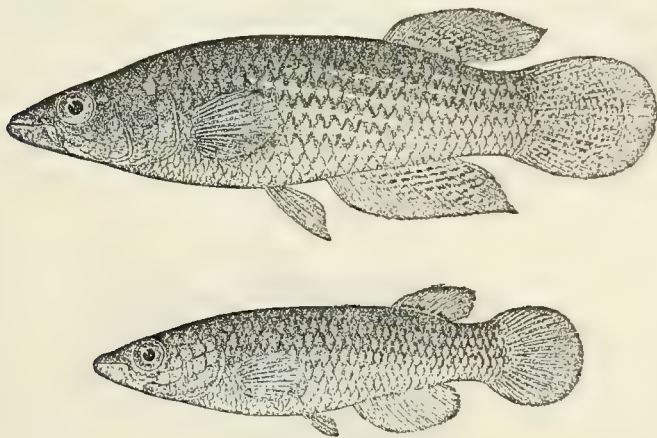
Madagascar, in brackish water.—Type in Paris Museum.

#### 11. HAPLOCHILUS PLAYFAIRII.

Günth. Cat. Fish. vi. p. 314 (1866); Playf. & Günth. Fish. Zanzib. p. 118, pl. xx. fig. 1 (1866).

Depth of body  $3\frac{1}{2}$  to 4 times in total length, length of head 3 times. Head flat above, snout broad, rounded, as long as eye; mouth directed upwards, lower jaw slightly projecting; eye  $3\frac{1}{2}$  to 4 times in length

Fig. 37.



*Haplochilus playfairii.*

♂ ♀, Mahé.

of head,  $\frac{1}{2}$  interorbital width; præorbital very narrow. Dorsal 12–13, originating twice as far from eye or occiput as from root of caudal, above middle or a little anterior to middle of anal; longest rays  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head in male, about  $\frac{1}{3}$  in female. Anal 17–19. Pectoral  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head, reaching or nearly reaching ventral; latter small, equally distant from end of snout and from root of caudal or a little



nearer latter. Caudal rounded,  $\frac{3}{5}$  to  $\frac{3}{4}$  length of head. Caudal peduncle as long as deep or a little deeper than long. 29-32 scales in longitudinal series, 22-24 round body in front of ventrals; lateral line entirely absent. Dark brown above, yellowish beneath, male with longitudinal series of light (in life red) spots corresponding to the series of scales and numerous small brown spots on the vertical fins.

Total length 95 millim.

Seychelles.

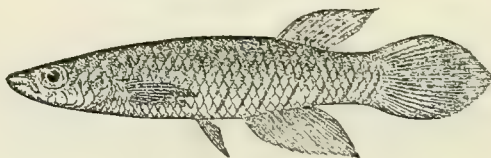
1-5, 6-9, 10-12,	Seychelles.	Sir L. Playfair (P.).
13-14, 15-16. Types.		
17-18. Ad.	"	"
19-20. Hgr.	"	Prof. E. P. Wright (C.).
21-22. Ad.	Mahé.	Sir J. Kirk (P.).
23-42. Ad. & hgr.	"	Lord Crawford (P.).
43-46. Ad. & hgr.	Chateau Margot, Mahé, 1000 ft.	Prof. J. Stanley Gardiner (P.).
47-50. Ad. & Hgr.	Praslin.	"
51. Skel.	"	"

## 12. HAPLOCHILUS FASCIOLATUS.

Günth. Cat. Fish. vi. p. 358, part. (1866); Arnold, Woch. Aq. Terr. 1911, p. 273, fig.; Aubry, t. c. p. 538, fig.

Depth of body 4 to  $4\frac{1}{2}$  times in total length, length of head 3 to  $3\frac{1}{2}$  times. Head flat above; snout broad, rounded, as long as or a little

Fig. 38.



*Haplochilus fasciolatus.*

♂, type.

shorter than eye; mouth directed upwards, lower jaw slightly projecting; eye  $3\frac{1}{2}$  times in length of head,  $\frac{1}{2}$  interorbital width; præorbital very narrow. Dorsal 11-12, originating twice as far from eye as from root of caudal, above middle of anal; longest rays about  $\frac{2}{3}$  length of head in male, shorter in female. Anal 16-18. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, extending a little beyond root of ventral; latter small, equally

distant from end of snout and from root of caudal. Caudal a little longer than head, rounded-subacuminate. Caudal peduncle as long as deep. 27-29 scales in longitudinal series, 20-22 round body in front of ventrals; lateral line indicated by a series of pits. Brownish above, each scale with a carmine spot, whitish beneath; lower part of side with more or less distinct dark oblique streaks or series of spots, which are best defined and extend to the upper surface on the caudal peduncle; males with carmine spots on the dorsal, anal, and caudal fins.

Total length 80 millim.

Sierra Leone.

1-4. Types.	Sierra Leone.	Dr. A. Günther (P.).
5-13. Ad. & hgr.	„	R. Dinzey, Esq. (P.).
14. Skel.	„	„
15-16. Hgr.	„	Mr. J. Paul Arnold (P.).

### 13. HAPLOCHILUS ANSORGII.

Bouleng. Ann. & Mag. N. H. (8) viii. 1911, p. 262.

Depth of body 4 times in total length, length of head  $3\frac{1}{2}$  to  $3\frac{1}{2}$  times. Head flat above; snout broad, rounded, as long as eye; mouth directed upwards, lower jaw slightly projecting; eye  $3\frac{2}{3}$  to 4 times in length of head,  $\frac{1}{2}$  interorbital width; præorbital about  $\frac{1}{4}$  diameter of eye. Dorsal 11, originating twice as far from occiput as from root of caudal, above middle of anal; longest rays about  $\frac{3}{4}$  length of head (males). Anal 16. Pectoral  $\frac{3}{4}$  length of head, reaching base of ventral;

Fig. 39.



*Haplochilus ansorgii.*

♂, type.

latter small, equally distant from end of snout and from root of caudal. Caudal acuminate, a little longer than head. Caudal peduncle as long as deep. 30-31 scales in longitudinal series, 18 round body in front of ventrals; lateral line indicated by a series of pits. Olive-brown above, yellowish beneath; sides with regular longitudinal series of carmine spots, following the series of scales and more or less confluent; lower

lip blackish ; fins grey, edged with black, dorsal and anal with round purplish-grey spots.

Total length 70 millim.

Ogowe.

1-2. Types. Masoma R., flowing into L. Agemwe Dr. W. J. Ansorge (C.).  
at Umpokoya.

#### 14. HAPLOCHILUS SEXFASCIATUS.

*Epiplatys sexfasciatus*, Gill, Proc. Ac. Philad. 1862, p. 136 ; Cope, Proc. Amer. Philos. Soc. xi. 1870, p. 457.

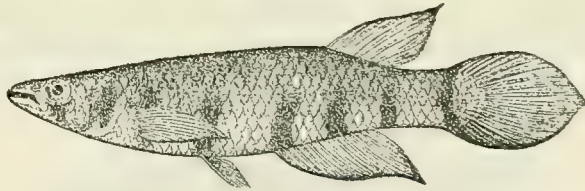
*Haplochilus infra fasciatus*, Günth. Cat. Fish. vi. p. 313 (1866) ; Steind. Notes Leyd. Mus. xvi. 1894, p. 76 ; Lönnb. Öfv. Vet.-Akad. Förh. Stockh. 1895, p. 188,

*Haplochilus sexfasciatus*, Bouleng. Proc. Zool. Soc. 1903, i. p. 27 ; Arnold, Woch. Aq. Terr. 1911, p. 557, fig. ; Gerlach, Bl. Aq. Terr. 1912, p. 741, fig.

*Lycocyprinus sexfasciatus*, Peters, Mon. Berl. Ac. 1868, p. 146.

Depth of body 4 to 5 times in total length, length of head  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times. Head flat above ; snout rounded, as long as or slightly longer than eye ; mouth directed upwards, lower jaw feebly projecting ; eye  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times in length of head, about  $\frac{1}{2}$  interorbital width ; præorbital about  $\frac{1}{4}$  diameter of eye. Dorsal 10-12, originating twice as far from occiput as from root of caudal, above middle of anal ; longest rays about

Fig. 40.



*Haplochilus sexfasciatus*.

♂, Ogowe.

$\frac{2}{3}$  length of head in males, shorter in females. Anal 15-17. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, extending a little beyond root of ventral ; latter equally distant from end of snout and from root of caudal. Caudal as long as or a little longer than head, rounded-subcarinate. Caudal peduncle as long as deep. 28-32 scales in longitudinal series, 20-22 round body in front of ventrals ; lateral line indicated by a series of pits. Brown above, yellowish beneath, with carmine dots and usually 5 to 7 blackish vertical bars on the body, confined, except the last, to the lower part of the side ; the first bar usually just behind the base of the pectoral ; two bars above the anal ; a series of large black dots some-

times present between the black bars; the black bars may be reduced to the four or five behind the vent; fins edged with black in the male.

Total length 100 millim.

Liberia to Congo.—Type in Philadelphia Academy Museum.

1-2. Hgr. & yg.	Nanna Kru, Liberia.	W. P. Lowe, Esq. (C.).
3-7. Hgr. & yg.	Atesu R., Gold Coast.	R. B. N. Walker, Esq. (C.); Dr. A. Günther (P.).
8-13. Hgr. & yg.	Bokitsa Mine, Wasa, Gold Coast.	„ „
14-21. Yg.	Kotchwah R., Gold Coast.	R. B. N. Walker, Esq. (P.).
22-28. Ad.	Near Dunkwa, Gold Coast.	Dr. H. G. F. Spurrell (P.).
29-38. Hgr. & yg.	Stream at Awka, Lower Niger.	Major G. E. Bruce (P.).
39-40. Ad. & hgr.	Sapelle, Lower Niger.	Dr. W. J. Ansorge (C.).
41-42. Hgr. & yg.	Assay, „ „	„
43-44. Ad.	Warri, „ „	Mr. J. Paul Arnold (P.).
45-47. Hgr.	Mouths of Niger.	„
48. Type of <i>H. infra-fasciatus</i> .	Old Calabar.	„
49-52. Ad. & hgr.	Stream at Udi, head-waters of Cross River.	Major G. E. Bruce (P.).
53. Hgr.	Omalu, head-waters of Aboina R., Cross R.	„
54-63. Ad., hgr., & yg.	Cross R. district, Old Calabar.	Major W. A. C. Cockburn (P.).
64-70. Ad., hgr., & yg.	Fernando Po.	Mr. E. Seimund (C.).
71. Skel.	„	„
72-73. Ad.	Longji, Cameroon.	Berlin Museum (E.).
74-76. Ad.	Lobi R., S. Cameroon.	G. L. Bates, Esq. (C.).
77-78. Ad.	Kribi R., „	„
79-87. Ad., hgr., & yg.	Benito R., Spanish Guinea.	„
88-89. Ad. & hgr.	Gaboon.	
90-91. Ad.	Abanga R., Ogowe.	Dr. W. J. Ansorge (C.).
92-98. Ad.	Luali R. (Chiloango) at Lundo.	„
99-100. Hgr.	Banzville, Ubanghi.	Capt. Royaux (C.).

*Pœcilia spilargyreia*, A. Dnm. Arch. Mus. x. 1861, p. 258 (which has been identified with *H. infrafasciatus* by Rochebrune, Faune Sénégal. p. 139), probably constitutes a distinct species, but the type specimens in the Paris Museum are too badly preserved to draw up a complete description. I am indebted to Dr. Pellegrin for notes on these



specimens. The principal difference from *H. sexfasciatus* appears to be that the head is only 3 or  $3\frac{1}{4}$  times in the total length. D. 11; A. 15; Sc. 27.

#### 15. HAPLOCHILUS CHAPERI.

*Pœcilia sexfasciata* (non Gill), Peters, Mon. Berl. Ac. 1864, p. 396.

*Haplochilus sexfasciatus*, Günth. Cat. Fish. vi. p. 213 (1866).

*Epiplatys infrafasciatus* (non Günth.), Cope, Proc. Amer. Philos. Soc. xi. 1870, p. 457.

*Haplochilus chaperi*, Sauv. Bull. Soc. Zool. Fr. 1882, p. 323, pl. v. fig. 5; Arnold, Woch. Aq. Terr. 1908, p. 297, pl. —; Ehnlé, Bl. Aq. Terr. 1910, p. 809, fig.

Depth of body nearly equal to length of head,  $3\frac{1}{2}$  to 4 times in total length. Head flat above; snout rounded, as long as eye; mouth directed upwards, lower jaw slightly projecting; eye  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times in length of head,  $\frac{1}{2}$  to  $\frac{3}{5}$  interorbital width; præorbital barely  $\frac{1}{3}$  diameter of eye. Dorsal 7–8, originating twice as far from occiput as from root of caudal, above middle of anal; longest rays about  $\frac{3}{4}$  length of head in male, shorter in female. Anal 14–15. Pectoral  $\frac{3}{4}$  to  $\frac{5}{6}$  length of head, extending a little beyond root of ventral; latter equally distant from end of snout and from root of caudal. Caudal as long as head, rounded or rounded-subacuminate, some of the rays slightly produced in males.

Fig. 41.



*Haplochilus chaperi*.

♂, Sierra Leone.

Caudal peduncle as long as deep. 25–27 scales in longitudinal series, 20 round body in front of ventrals; lateral line indicated by an interrupted series of pits. Brown above, sometimes with carmine spots; yellowish beneath; six or seven black vertical bars on each side, the first at the eye or on the gill-cover; one often present between the pectoral and the ventral, two or three above the anal, the last at the base of the caudal; only the last or last two extending to the upper surface of the body; the scales of the back edged with red in the male; a black band round the lower lip; fins edged with black in the male, which may have two black spots or vertical bars on the anal.

Total length 65 millim.

Sierra Leone to Gold Coast.—Types in Paris Museum.

1-2. Ad.	Sierra Leone.	Mr. J. Paul Arnold (P.).
3-5. Ad. & Hgr.	Liberia.	"
6-7. Ad.	"	G. A. Boulenger, Esq. (P.).
8. One of the types.	Assini, Gold Coast.	M. Chaper (C.); Paris Museum (P.).

## 16. HAPLOCHILUS DECORSII.

Pellegr. Bull. Mus. Paris, 1904, p. 223.

Depth of body  $3\frac{2}{3}$  to 4 times in total length, length of head  $3\frac{1}{2}$  times. Head flat above; snout broad, rounded, as long as or a little shorter than eye; lower jaw projecting; eye nearly 4 times in length of head,  $1\frac{1}{2}$  times in interorbital width. Dorsal 8-9, originating twice as far from anterior border of eye as from root of caudal, above middle of anal. Anal 13-14. Pectoral  $\frac{2}{3}$  length of head. Caudal rounded-acuminate, longest rays sometimes as long as head. Caudal peduncle  $1\frac{1}{2}$  times as long as deep. 25-28 scales in longitudinal series, 24-26 round body in front of ventrals. Yellowish, each scale with a dark edge; a dark line from head to origin of dorsal; fins with carmine dots, caudal finely edged with carmine in the male.

Total length 40 millim.

Ubanghi.—Types in Paris Museum.

## 17. HAPLOCHILUS EXIGUUS.

Bouleng. Ann. & Mag. N. H. (8) viii. 1911, p. 265.

Depth of body 4 times in total length, length of head  $3\frac{1}{2}$  times. Head flat above; snout broad, rounded, a little shorter than eye; mouth directed upwards, lower jaw slightly projecting; eye  $3\frac{1}{2}$  times in length of head,  $\frac{2}{3}$  interorbital width; præorbital nearly  $\frac{1}{3}$  diameter of eye.

Fig. 42.



*Haplochilus exiguus*.

♂, type.  $\frac{4}{3}$ .

Dorsal 8, originating twice as far from eye as from root of caudal, above middle of anal; penultimate ray produced into a long filament (♂). Anal 12. Pectoral  $\frac{3}{5}$  length of head, barely reaching base of ventral; latter small, equally distant from end of snout and from root of caudal.

Caudal rounded, slightly shorter than head. Caudal peduncle  $1\frac{1}{2}$  times as long as deep. 28 scales in longitudinal series, 22 round body in front of ventrals. Yellowish, sides tinged with carmine; a carmine streak on each side of the head, through the eye, and round the chin; another below the eye; gill-membranes, pectorals, and ventrals edged with carmine; dorsal and anal with a longitudinal streak and some carmine spots; caudal bordered all round with carmine, with three bars of the same colour.

Total length 32 millim.

South Cameroon.

1. Type.

Nyong River.

G. L. Bates, Esq. (C.).

### 18. HAPLOCHILUS ELEGANS.

Bouleng. Ann. Mus. Congo, Zool. i. p. 113, pl. xlvii. fig. 2 (1899), and Poiss. Bass. Congo, p. 345 (1901).

Depth of body  $4\frac{1}{2}$  to  $5\frac{1}{3}$  times in total length, length of head  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times. Head flat above; snout as long as eye; mouth directed upwards, lower jaw projecting; eye 3 to  $3\frac{1}{3}$  times in length of head,  $1\frac{1}{2}$  times in interorbital width; præorbital very narrow. Dorsal 8,

Fig. 43.



*Haplochilus elegans.*

♂, type (A. M. C.).

originating twice as far from anterior border of eye as from root of caudal, above middle of anal produced into a filament in males. Anal 14-15, produced like the dorsal. Pectoral  $\frac{3}{4}$  length of head, nearly reaching base of ventral; latter a little nearer end of snout than caudal. Caudal forked, upper and lower rays produced into filaments in the male. Caudal peduncle nearly twice as long as deep. 30-32 scales in longitudinal series, 20 round body in front of ventrals; lateral line indicated by a series of pits. Yellowish or pale olive, brown on the back, most of the scales edged with carmine; vertical fins with carmine dots and edged with carmine or dark purple.

Total length 40 millim.

Upper Congo.—Types in Congo Museum, Tervueren.

1-3. Types.

Bikoro, L. Tumba.

M. P. Delhez (C.).

4-5. „

Coquilhatville.

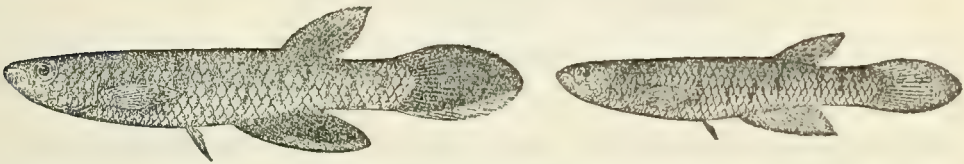
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## 19. HAPLOCHILUS PETERSII.

Sauv. Bull. Soc. Zool. France, 1882, p. 324, pl. v. fig. 6\*.

Depth of body  $4\frac{1}{2}$  to 5 times in total length, length of head  $3\frac{1}{2}$  to 4 times. Head flat above; snout as long as eye; lower jaw projecting; eye  $3\frac{1}{2}$  to 4 times in length of head,  $1\frac{2}{3}$  to 2 times in interorbital width; præorbital very narrow. Dorsal 9–10, originating twice as far from occiput or posterior border of eye as from root of caudal, above middle of anal; longest ray about  $\frac{2}{3}$  length of head. Anal 14–15. Pectoral a little shorter than head, reaching ventral or not quite so far. Ventral small, equally distant from end of snout and from root of caudal. Caudal rounded, as long as or a little longer than head. Caudal peduncle a

Fig. 44.

*Haplochilus petersii.*

♂ ♀, Dunkwa.  $\times 1\frac{1}{3}$ .

little longer than deep. 30–32 scales in longitudinal series, 20 or 22 round body in front of ventrals; lateral-line pits feebly marked. Brownish or greenish, scales edged with carmine, with or without red spots; 6 to 10 vertical or more or less oblique dark bars may be present on each side; vertical fins with oblique series of small dark or red spots, or (males) dark purplish grey with the lower edge of the anal and caudal yellow or orange, which colour sometimes also occupies the upper border of the caudal.

Total length 55 millim.

Gold Coast.—Type in Paris Museum.

1–9. Ad. & hgr. Dunkwa, Gold Coast. Dr. H. G. F. Spurrell (P.).

## 20. HAPLOCHILUS CALLIURUS.

Bouleng. Ann. & Mag. N. H. (8) viii. 1911, p. 265; Arnold, Woch. Aq. Terr. 1911, p. 559, fig.

*Haplochilus elegans* (non Bouleng.), Arnold, Woch. Aq. Terr. v. 1908, no. 23, pl. —.

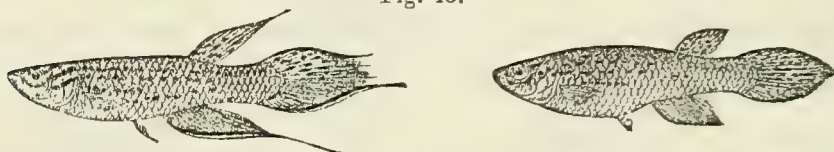
? *Haplochilus cameronensis* (non Bouleng.), Träber, Bl. Aq. Terr. 1911, p. 773, fig.

\* I am informed by Dr. Pellegrin that the number of dorsal rays is incorrectly given as seven in the original description.



Depth of body  $3\frac{1}{2}$  to  $4\frac{1}{3}$  times in total length, length of head  $3\frac{1}{3}$  to  $3\frac{2}{3}$  times. Head flat above; snout short and broad, nearly as long as eye; mouth directed upwards, lower jaw projecting; eye  $3\frac{2}{3}$  to 4 times in length of head, twice in interorbital width; præorbital not more than  $\frac{1}{4}$  diameter of eye. Dorsal 9–10, originating twice as far from centre or anterior border of eye as from root of caudal, above middle of anal; longest ray  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head in female, antepenultimate produced into a long filament in male. Anal 12–13, the antepenultimate ray produced into a very long filament in male. Pectoral  $\frac{2}{3}$  to  $\frac{4}{5}$  length of head,

Fig. 45.

*Haplochilus calliurus.*

♂ ♀, types.

reaching base of ventrals in male, not in female; ventral very small, equally distant from end of snout and from root of caudal, outer ray produced into a short filament in male. Caudal rounded-acuminate or decidedly pointed, one or two of the median rays sometimes produced in males. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. 29–30 scales in longitudinal series, 20–22 round body in front of ventrals; lateral line indicated by a series of pits. Olive or brownish above, yellowish white beneath, with carmine spots, which are larger and brighter in the males, in which they may be confluent into longitudinal streaks; fins greyish, dorsal and caudal spotted with carmine; in males, anal edged with carmine and white, and lower border of caudal similarly marked.

Total length 50 millim.

Liberia.

1–2, 3–12. Types.

Liberia.

Mr. J. Paul Arnold (P.).

13–15. Ad.

W. Africa.

Mr. G. Gerlach (P.).

## 21. HAPLOCHILUS STRIATUS.

Bouleng. Ann. & Mag. N. H. (8) viii. 1911, p. 266.

Depth of body 4 to  $4\frac{1}{3}$  times in total length, length of head  $3\frac{1}{3}$  to  $3\frac{2}{3}$  times. Head flat above; snout short and broad, shorter than eye; mouth directed upwards, lower jaw projecting; eye  $3\frac{1}{3}$  times in length of head,  $1\frac{1}{2}$  times in interorbital width; præorbital about  $\frac{1}{4}$  diameter of eye. Dorsal 9–10, originating twice as far from centre or anterior

border of eye and from root of caudal, above middle of anal, acutely pointed behind, longest ray  $\frac{3}{4}$  length of head (males). Anal 13, pointed like the dorsal. Pectoral  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head, reaching base of ventral; latter small, equally distant from end of snout and from root of caudal. Caudal rounded, with one of the upper rays produced into a short filament in the male. Caudal peduncle  $1\frac{1}{3}$  times as long as deep. 30–31 scales in longitudinal series, 20–22 round body in front of ventrals; lateral-line pits very indistinct or absent. Pale olive above, yellowish, white beneath; carmine spots forming 3 or 4 regular longitudinal series on each side, separated by olive streaks or confluent into

Fig. 46.

*Haplochilus striatus.*♂, type.  $\frac{4}{3}$ .

as many longitudinal bands; fins greyish, dorsal and anal edged with carmine and with a carmine median streak in the male; caudal spotted with carmine and with a carmine and white streak above and below.

Total length 40 millim.

Ogowe and Portuguese Congo.

- |             |  |                         |
|-------------|--|-------------------------|
| 1–4. Types. | Abanga R., Ogowe, between 1st<br>and 2nd rapids. | Dr. W. J. Ansorge (C.). |
| 5. Ad.      | Lundo, Luali R., Portuguese<br>Congo.            | „                       |

## 22. HAPLOCHILUS SPILAUCHEN.

*Pœcilia spilauchena*, A. Dum. Arch. Mus. x. 1859, p. 258, pl. xxii. fig. 6.

*Apocheilichthys typus*, Bleek. Nat. Verh. Vet. Haarlem, xviii. 1863, no. 2, p. 116, pl. xxiv. fig. 1.

*Pœcilia bensonii*, Peters, Mon. Berl. Ac. 1864, p. 395.

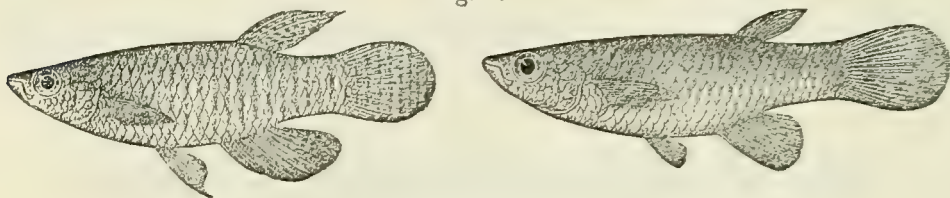
*Haplochilus spilauchen*, Günth. Cat. Fish. vi. p. 312 (1864); Steind. Sitzb. Ak. Wien, lxi. i. 1870, p. 558, and Notes Leyd. Mus. xvi. 1894, p. 75; Bouleng. Poiss. Bass. Congo, p. 345 (1901); Pellegr. Bull. Mus. Paris, x. 1904, p. 223; Gerlach, Bl. Aq. Terr. 1911, p. 722, fig.

*Haplochilichthys spilauchen*, part., Garm. Mem. Mus. Comp. Zool. xix. 1895, p. 157.

Depth of body 3 to 4 times in total length, length of head  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times. Head flat above; snout broad, rounded, as long as or a little shorter than eye; mouth terminal, jaws equal in front or upper slightly

projecting; eye as long as postocular part of head, about  $\frac{2}{3}$  interorbital width; præorbital about  $\frac{1}{2}$  diameter of eye. Dorsal 7–8, originating twice as far from centre or posterior border of eye as from root of caudal, above middle of anal; longest rays nearly as long as head in male, much shorter in female. Anal 13–14. Pectoral  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head, extending a little beyond root of ventral; latter nearer end of snout than root of caudal, rather long and pointed in the male. Caudal nearly

Fig. 47.

*Haplochilus spilauchen.*

♂ ♀, Gaboon.

as long as head, rounded. Caudal peduncle as long as deep. 25–28 scales in longitudinal series, 16–18 round body in front of ventrals; lateral line absent or represented by a few very few shallow pits. Brownish or dark olive-green above, whitish beneath; male usually with very numerous dark vertical bars, most distinct on the caudal part of the body; fins uniform white in the female; in the male, dorsal and posterior part of anal with numerous dark spots forming transverse series, and numerous vertical dark bars on the caudal.

Total length 70 millim.

West Africa, from Senegal to Lower Congo.—Types in Paris Museum.

1. Ad.	Geba R. at Bafata, Portug. Guinea.	Dr. W. J. Ansorge (C.).
2–7. Ad.	Lagos, in mangrove swamp.	Major G. E. Bruce (P.).
8–12. Ad.	Degama, Lower Niger.	Dr. W. J. Ansorge (C.).
13. Hgr.	Warri, „	Mr. J. Paul Arnold (P.).
14–15. Ad.	Old Calabar.	„
16–18. Ad. & hgr.	„	Miss Kingsley (C.).
19–23. Ad.	Benito R., Spanish Guinea.	G. L. Bates, Esq. (C.).
24. Skel.	„ „	„
25. Ad.	Gaboon.	R. B. N. Walker, Esq. (C.).
26–31, 32–33, 34, 35. Ad. & hgr.	„	
36. Hgr.	Ogowe.	Miss Kingsley (C.).
37–38. Ad.	Chiloango Town, Portuguese Congo.	Dr. W. J. Ansorge (C.).

## 23. HAPLOCHILUS HUTEREAU.

Bouleng. Rev. Zool. Afr. ii. 1913, p. 159.

Depth of body 3 times in total length, length of head  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times. Head flat above; snout broad, rounded, shorter than eye; mouth directed upwards, lower jaw projecting; eye nearly as long as postocular part of head, about  $\frac{2}{3}$  to  $\frac{3}{4}$  interorbital width; præorbital not quite  $\frac{1}{2}$  diameter of eye. Dorsal 8-9, originating twice as far from end of snout

Fig. 48.



*Haplochilus hutereau.*

Type.  $\frac{4}{3}$ .

or anterior border of eye as from root of caudal, above middle of anal; longest rays as long as head or a little shorter. Anal 13-15. Pectoral  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head, extending beyond root of ventral; latter nearer end of snout than root of caudal. Caudal rounded, as long as head. Caudal peduncle as long as deep. 23-24 scales in longitudinal series, 16 round body in front of ventrals; lateral line absent. Yellowish, the scales edged with dark brown; fins white, with four or five blackish bars or transverse series of blackish spots on the posterior half of the dorsal and anal and on the caudal.

Total length 35 millim.

Uelle River, Upper Congo, and Lake Mweru.—Types in Congo Museum, Tervueren.

1. One of the types.

Dungu, Uelle.

M. Hutereau (C.).

## 24. HAPLOCHILUS LOATI.

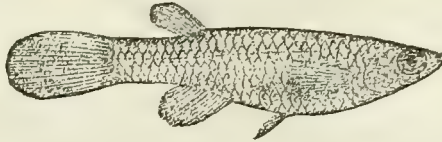
Bouleng. Ann. & Mag. N. H. (7) viii. 1901, p. 446, and Fish. Nile, p. 417, pl. lxxix, fig. 7 (1907).

Depth of body  $3\frac{2}{3}$  to 5 times in total length, length of head 4 to  $4\frac{1}{2}$  times. Head flat above; snout very short, shorter than eye; mouth directed upwards, lower jaw projecting; eye less than 3 times in length of head, as long as postorbital part of head,  $1\frac{1}{2}$  times in interorbital width; præorbital about  $\frac{1}{3}$  diameter of eye. Dorsal 7-8, originating twice as far from eye as from root of caudal, above middle of anal;



longest ray about  $\frac{3}{5}$  length of head. Anal 14–15. Pectoral about  $\frac{2}{3}$  length of head, extending to base of ventral; latter small, nearly equally distant from end of snout and from root of caudal. Caudal rounded, a little longer than head. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as

Fig. 49.

*Haplochilus loati.*Type (F. N.).  $\frac{5}{2}$ .

deep. 24–25 scales in longitudinal series, 14 round body in front of ventrals; no lateral-line pits. Yellowish olive above, the scales edged with darker, whitish beneath; usually a fine blackish lateral line; fins white, without markings.

Total length 25 millim.

White Nile, Bahr-el-Gebel.

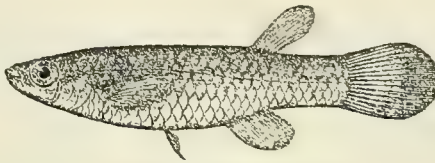
1–40. Types.	Lake No.	L. Loat, Esq. (C.).
41–44. Ad.	„ „	H. H. King, Esq. (P.).
45. Ad.	Fashoda.	L. Loat, Esq. (C.).
46. Ad.	Gondokoro.	„

## 25. HAPLOCHILUS KINGII.

Bouleng. Ann. & Mag. N. H. (8) xii. 1913, p. 566.

Depth of body  $3\frac{1}{3}$  to 4 times in total length, length of head 3 to  $3\frac{1}{2}$  times. Head flat above; snout very short, shorter than eye, which

Fig. 50.

*Haplochilus kingii.*Type.  $\times 1\frac{3}{4}$ .

equals postorbital part of head; mouth directed upwards, lower jaw projecting; interorbital width  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times diameter of eye; præorbital  $\frac{1}{3}$  to  $\frac{1}{2}$  diameter of eye. Dorsal 6–7, originating  $1\frac{3}{4}$  to 2 times as far

from eye as from root of caudal, above middle or posterior third of anal; longest ray about  $\frac{2}{3}$  length of head. Anal 11-12. Pectoral about  $\frac{3}{4}$  length of head, extending to beyond base of ventral; latter small, equally distant from end of snout and from root of caudal. Caudal rounded, as long as or a little longer than head. Caudal peduncle a little longer than deep. 26-27 scales in longitudinal series, 16 round body in front of ventrals. Yellowish, the scales on the sides and back finely edged with brown, the black powdered with brown; a fine blackish lateral line; fins whitish, dorsal, anal, and caudal sometimes blackish (males).

Total length 34 millim.

White Nile and Sobat.

1-5. Types.

Khor on Sobat R.

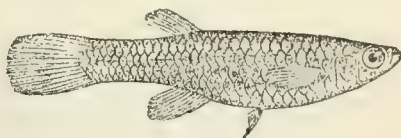
H. H. King, Esq. (P.).

## 26. HAPLOCHILUS SCHOELLERI.

Bouleng. Ann. & Mag. N. H. (7) xiv. 1904, p. 136; Werner, Sitzb. Ak. Wien, exv. i. 1906, p. 1142; Bouleng. Fish. Nile, p. 415, pl. lxxix. fig. 6 (1907).

Depth of body  $3\frac{1}{2}$  to  $4\frac{1}{2}$  times in total length, length of head  $3\frac{1}{2}$  to 4 times. Head flat above; snout very short, shorter than eye; mouth directed upwards, lower jaw projecting; eye not more than 3 times in length of head, as long as or a little shorter than postorbital part of

Fig. 51.



*Haplochilus schoelleri*.

Type (F. N.).  $\frac{3}{2}$ .

head,  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times in interorbital width; præorbital  $\frac{1}{3}$  to  $\frac{1}{2}$  diameter of eye. Dorsal 7-8, originating  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times as far from eye as from root of caudal, above middle of anal; longest ray about  $\frac{2}{3}$  length of head. Anal 12-13. Pectoral about  $\frac{2}{3}$  length of head, extending to base of ventral; latter small, much nearer end of snout than root of caudal. Caudal rounded, a little longer than head. Caudal peduncle  $1\frac{1}{2}$  to 2 times as long as deep. 25-28 scales in longitudinal series, 14-16 round body in front of ventrals; no lateral-line pits. Yellowish olive (blue in life), the scales finely edged with blackish,

often with a fine blackish lateral line ; dorsal and caudal colourless, the latter edged with red above and beneath in the male ; other fins yellow.

Total length 33 millim.

Egypt.

1-8. Types.	Near Lake Marcotis.	C. H. Schoeller, Esq. (P.).
9-48, 49-58. Ad. & hgr.	Ghet-el-Nassara, L. Men- zaleh.	L. Loat, Esq. (C.).
59. Ad.	Birket Karun, Fayum.	Dr. W. A. Cunningham and Dr. C. L. Boulenger (P.).

## 27. HAPLOCHILUS MOERUENSIS.

Bouleng. Rev. Zool. Afr. iii. 1914, p. 447.

Depth of body  $4\frac{1}{3}$  to  $4\frac{1}{2}$  times in total length, length of head  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times. Head flat above ; snout very short, shorter than eye ; mouth

Fig. 52.



*Haplochilus moeruensis*.

Type.  $\times 1\frac{3}{4}$ .

directed upwards, lower jaw projecting ; eye  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times in length of head, as long as postorbital part of head, about  $1\frac{1}{3}$  times in interorbital width ; præorbital about  $\frac{1}{4}$  diameter of eye. Dorsal 7-8, originating about  $1\frac{1}{2}$  times as far from eye as from root of caudal, above middle of anal ; longest ray about  $\frac{1}{2}$  length of head. Anal 14-16. Pectoral about  $\frac{2}{3}$  length of head, extending to base of ventral ; latter small, much nearer end of snout than root of caudal. Caudal rounded, a little longer than head. Caudal peduncle twice as long as deep. 26-28 scales in longitudinal series, 16 round body in front of ventrals ; no lateral-line pits. Yellowish, top of head and back, and borders of the scales speckled with dark brown ; fins whitish.

Total length 34 millim.

Lake Mweru.—Types in Congo Museum, Tervueren.

1-6. Types.	L. Mweru at Kilug.	Dr. L. Stappers (C.).
7-11. Types.	L. Mweru at Nkole.	..

## 28. HAPLOCHILUS MACRURUS.

Bouleng. Ann. & Mag. N. H. (7) xiv. 1904, p. 19.

Depth of body equal to length of head,  $3\frac{1}{2}$  to 4 times in total length. Head flat above; snout much shorter than eye; mouth directed upwards, lower jaw projecting; eye not quite 3 times in length of head, a little less than interorbital width; præorbital  $\frac{1}{4}$  to  $\frac{1}{3}$  diameter of eye. Dorsal 7-8, originating at equal distance from head and from root of caudal, or a little nearer latter, above middle of anal; longest rays  $\frac{3}{5}$  to  $\frac{4}{5}$  length of head. Anal 12-14, longest rays as long as head. Pectoral  $\frac{3}{4}$  length of head, reaching beyond base of ventral; latter small, nearer end of snout than root of caudal. Caudal rounded, longer than head. Caudal peduncle a little longer than deep. 24-27 scales in longitudinal series, 16-18 round body in front of ventrals; no lateral-line pits. Pale brownish, finely speckled with darker; a fine dark lateral line; some-

Fig. 53.



*Haplochilus macrurus*.

♂, type.  $\frac{4}{3}$ .

times a dark spot in the axil and another at the base of the ventral fin; fins uniform greyish.

Total length 50 millim.

Angola, Old Calabar.

1-8. Types.	Marimba, L. Sarmiento, Angola.	Dr. W. J. Ansorge (C.).
9-10. Ad.	Quanza R. at Dondo, Angola.	"
11-13. Hgr.	Old Calabar.	Mr. J. Paul Arnold (P.).

## 29. HAPLOCHILUS KATANGÆ.

Bouleng. Rev. Zool. Afr. ii. 1912, p. 47.

Depth of body equal to length of head,  $3\frac{1}{3}$  to  $3\frac{2}{3}$  in total length. Head flat above; snout shorter than eye; mouth directed upwards; lower jaw projecting; eye  $2\frac{1}{2}$  to 3 times in length of head, considerably less than interorbital width; præorbital  $\frac{1}{4}$  diameter of eye. Dorsal 9-10, originating at equal distance from head and from root of caudal, above middle of anal; longest rays  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Anal 14-15, rays not much longer than dorsals. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head,



reaching beyond base of ventral; latter small, nearer end of snout than root of caudal. Caudal rounded, as long as head. Caudal peduncle longer than deep. 25-27 scales in longitudinal series, 16 round body in front of ventrals; no lateral-line pits. Yellowish, scales edged with brown; a blackish lateral streak along the lower half of the body, from

Fig. 54.

*Haplochilus katangæ.*Type.  $\frac{2}{1}$ .

the pectoral fin to the root of the caudal; fins uniform greyish, or dorsal and anal with small dark dots at the base.

Total length 25 millim.

Katanga.—Types in Congo Museum, Tervueren.

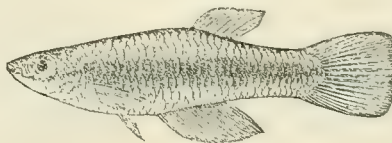
- |             |                                     |                       |
|-------------|-------------------------------------|-----------------------|
| 1-2. Types. | Lubumbashi R., near Elizabethville. | M. Poppe (C.).        |
| 3-8. Ad.    | Elizabethville.                     | Dr. L. Stappers (C.). |

### 30. HAPLOCHILUS CABINDÆ.

Bouleng. Ann. & Mag. N. H. (8) viii. 1911, p. 264, and Ann. Mus. Congo, Zool. ii. 3, p. 21 (1912).

Depth of body equal to length of head,  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times in total length. Head flat above; snout much shorter than eye; mouth directed

Fig. 55.

*Haplochilus cabindæ.*Type.  $\frac{4}{3}$ .

upwards, lower jaw slightly projecting; eye  $2\frac{2}{3}$  times in length of head, a little less than interorbital width; præorbital  $\frac{1}{3}$  diameter of eye. Dorsal 8-9, originating at equal distance from head and from root of caudal, or nearer latter, above middle of anal; longest rays  $\frac{3}{5}$  length

of head in female, nearly as long as head in male. Anal 14-15, longest rays  $\frac{3}{5}$  to  $\frac{3}{4}$  length of head. Pectoral  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head, reaching beyond base of ventral; latter much nearer end of snout than root of caudal, small in the female, produced to beyond origin of anal in male. Caudal truncate, as long as head. Caudal peduncle  $1\frac{1}{2}$  times as long as deep. 29-31 scales in longitudinal series, 16-18 round body in front of ventrals; no lateral-line pits. Yellowish, finely speckled with blackish, the vertebral line and a broad lateral band olive-brown; fins uniform greyish.

Total length 52 millim.

Portuguese Congo.

1-2. Types.	Lucola R., near Cabinda.	Dr. W. J. Ansorge (C.).
3-4. Ad.	Buco Zau, Luali R.	"

### 31. HAPLOCHILUS JOHNSTONII.

Günth. Proc. Zool. Soc. 1893, p. 627; Bouleng. Ann. Natal Mus. i. 1908, p. 220.

*Haplochilus atripinna*, Pfeff. Thierw. O.-Afr., Fische, p. 46 (1896); Hilgendorf & Pappenheim. Sitzb. Ges. naturf. Fr. 1903, p. 271.

Depth of body 4 to 5 times in total length, length of head  $3\frac{1}{2}$  to 4 times. Head flat above; snout short and broad, shorter than eye; mouth directed upwards, lower jaw projecting; eye  $2\frac{2}{3}$  to 3 times in length of head, not or but little shorter than postocular part of head,  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times in interorbital width; præorbital nearly  $\frac{1}{2}$  diameter of eye. Dorsal 7-8, originating twice as far from eye as from root of caudal, above posterior third of anal; longest rays  $\frac{2}{3}$  to  $\frac{4}{5}$  length of head. Anal 13-14. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, reaching base

Fig. 56.



*Haplochilus johnstonii*.

Type.

of ventral; latter moderately large, much nearer end of snout than root of caudal. Caudal rounded, not or but slightly longer than head. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times as long as deep. 28-29 scales in longitudinal series, 18-20 round body in front of ventrals; no lateral-

line pits. Pale yellowish brown, finely speckled with darker, especially on the borders of the scales; a fine blackish line runs along the side of the body; fins greyish.

Total length 47 millim.

Nyasaland, Lake Rukwa, and Zululand.

1-8. Types.	Fort Johnston.	A. Whyte, Esq. (C.); Sir H. H. Johnston (P.).
9. Ad.	Indukuduku, Zululand.	Dr. E. Warren (P.).

### 32. HAPLOCHILUS MARNI.

*Haplochilus fasciolatus*, part., Günth. Cat. Fish. vi. p. 358 (1866), and Petherick's Trav. ii. p. 258 (1869).

*Haplochilus marnoi*, Steind. Sitzb. Ak. Wien, lxxxiii. i. 1881, p. 198; Bouleng. Fish. Nile, p. 418, pl. lxxix. fig. 8 (1907).

Depth of body  $4\frac{1}{3}$  to  $5\frac{2}{5}$  times in total length, length of head 3 to  $3\frac{1}{2}$  times. Head flat above; snout as long as eye; mouth directed upwards, lower jaw feebly projecting; eye 3 to  $3\frac{1}{2}$  times in length of head,  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times in interorbital width; præorbital  $\frac{1}{4}$  diameter of eye.

Fig. 57.



*Haplochilus marni*.  
Mongalla (F. N.).  $\frac{3}{2}$ .

Dorsal 7-8, originating twice as far from head as from root of caudal, above posterior third of anal; longest ray about  $\frac{1}{2}$  length of head. Anal 14-15. Pectoral about  $\frac{2}{3}$  length of head, extending beyond base of ventral; latter small, equally distant from end of snout and from root of caudal. Caudal rounded or obtusely pointed, nearly as long as head. Caudal peduncle a little longer than deep. 27-28 scales in longitudinal series, 18-20 round body in front of ventrals; lateral line indicated by a series of pits. Pale brown above, yellowish white beneath, with 9 to 12 dark brown or blackish oblique bands on each side of the body, directed downwards and forwards; two or three similar bands may be present on the caudal fin; dorsal and anal purplish or bluish grey, the latter sometimes with small crimson spots.

Total length 42 millim.

White Nile and Bahr-el-Gebel.—Types in Vienna Museum.

1. One of the types of <i>H. fasciolatus</i> .	Khartum.	J. Petherick, Esq. (C.).
2-3. Ad.	Khor Barboy, White Nile.	H. H. King, Esq. (P.).
4. Ad.	L. No, White Nile.	L. Loat, Esq. (C.).
5. Ad.	Mongalla, near Gondokoro.	Dr. F. Werner (P.).

## 33. HAPLOCHILUS SENEGALENSIS.

Steind. Sitzb. Ak. Wien, lxi. i. 1870, p. 559, pl. vii. fig. 2; Wolterstorff, Bl. Aq. Terr. 1913, p. 82, fig.

*Haplochilus petersii*?, Träber, Bl. Aq. Terr. 1912, p. 33, fig.

Depth of body  $4\frac{1}{2}$  to  $5\frac{2}{3}$  times in total length, length of head  $3\frac{2}{5}$  or  $3\frac{1}{2}$  times. Head flat above; snout as long as or a little shorter than eye; mouth directed upwards, low jaw projecting; eye  $3\frac{1}{2}$  to 4 times in length of head, twice in interorbital width; præorbital barely  $\frac{1}{4}$  diameter of eye. Dorsal 8-9, originating twice as far from head as from root of caudal, above posterior third or fourth of anal, longest rays  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Anal 15-16. Pectoral  $\frac{3}{4}$  length of head, extending to base of ventral or a little beyond; ventral small, equally distant from end

Fig. 58.

*Haplochilus senegalensis*.

Type, after Steindachner (*l. c.*).

of snout and from root of caudal or a little nearer latter. Caudal rounded, slightly longer than head. Caudal peduncle a little longer than deep. 26-29 scales in longitudinal series, 20-22 round middle of body. Pale olive, with carmine dots or with 10-12 oblique dark bars on the body, pointing downwards and forwards; a carmine or dark streak round the lower jaw; dorsal, anal, and caudal usually spotted with brown or purple, the spots forming oblique bars on the dorsal and anal and transverse bars on the caudal.

Total length 50 millim.

Senegal to Old Calabar.—Type in Vienna Museum.

1-2. Hgr.	Dubola, French Guinea.	Dr. Klaptsner (C.).
3-4. Hgr.	N. Territory of Gold Coast.	Dr. A. Ingram (P.).
5-10. Ad. & hgr.	Gold Coast.	Dr. W. Wolterstorff (P.).
11-12. Ad.	Old Calabar.	Mr. J. Paul Arnold (P.).



## 34. HAPLOCHILUS ACUTICAUDATUS.

*Haplochilus senegalensis*, var. *acuticaudata*, Pellegr. Bull. Soc. Zool. France, xxxviii. 1913, p. 84.

Depth of body  $4\frac{2}{3}$  to 5 times in total length, length of head 3 to  $3\frac{2}{3}$  times. Head flat above; snout as long as or a little shorter than eye; mouth directed upwards; lower jaw feebly projecting; eye 3 to 4 times in length of head. Dorsal 9–10, originating twice as far from head as from root of caudal, above posterior third of anal. Anal 15–16. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Ventral reaching anal. Caudal acuminate, as long as head. Caudal peduncle nearly as long as deep. Olive-brown above, yellow beneath, with about 10 oblique dark bars on each side.

Total length 43 millim.

Guidimoussi Pond, Lake Chad District.—Types in Paris Museum.

## 35. HAPLOCHILUS LONGIVENTRALIS.

Bouleng. Ann. & Mag. N. H. (8) viii. 1911, p. 266.

*Haplochilus spilargyreus* (non A. Dum.), Arnold, Woch. Aq. Terr. 1911, p. 558, fig.

Depth of body  $4\frac{1}{3}$  to 5 times in total length, length of head 3 to  $3\frac{1}{3}$  times. Head flat above; snout rounded, a little longer than eye;

Fig. 59.



*Haplochilus longiventralis*.

♂ ♀, types, Old Calabar.

mouth directed upwards, lower jaw slightly projecting; eye  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times in length of head,  $1\frac{2}{3}$  to  $1\frac{3}{4}$  times in interorbital width; præorbital barely  $\frac{1}{4}$  diameter of eye. Dorsal 8–9, originating twice as far from head as from root of caudal, above posterior third or fourth of anal; longest rays  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Anal 15–16. Pectoral a little shorter than head, extending beyond base of ventral; latter  $\frac{1}{2}$  as long as head in females, much produced and at least as long as pectoral in adult males, equally distant from end of snout and from root of caudal. Caudal rounded-acuminate, longer than head. Caudal

peduncle as long as deep. 25–27 scales in longitudinal series, 20 round middle of body in front of ventrals; lateral line indicated by a series of pits. Pale brown above, yellowish beneath, with or without carmine dots; lower part of sides with numerous vertical or oblique dark brown or carmine narrow bars; some dark spots may be present on the dorsal and caudal fins.

Total length 55 millim.

Southern Nigeria.

1–6. Types.	Swamps between Agwarba and Awka, L. Niger.	Capt. R. D. Gard'ner (P.).
7–8. „	Old Calabar.	Mr. J. Paul Arnold (P.).
9. „	Mouths of Niger.	„
10–11. Ad.	„ „	„

### 36. HAPLOCHILUS MACROSTIGMA.

Bouleng. Ann. & Mag. N. H. (8) viii. 1911, p. 268, and Ann. Mus. Congo, Zool.

ii. 3, p. 22 (1912); Wolterstorff, Bl. Aq. Terr. 1913, p. 83, fig.

*Haplochilus senegalensis* (non Steind.), Arnold, Woch. Aq. Terr. 1912, p. 61, fig.;

Träber, Bl. Aq. Terr. 1912, p. 17, fig.

Depth of body  $4\frac{1}{3}$  to  $4\frac{1}{2}$  times in total length, length of head  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times. Head flat above; snout as long as eye; mouth directed

Fig. 60.



*Haplochilus macrostigma.*

Type.  $\frac{4}{3}$ .

upwards, lower jaw scarcely projecting; eye  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times in length of head,  $1\frac{1}{2}$  to  $1\frac{3}{4}$  times in interorbital width; præorbital very narrow. Dorsal 8–9, originating twice as far from head as from root of caudal, above posterior third or fourth of anal; longest ray  $\frac{1}{2}$  length of head. Anal 15–16. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, reaching base of ventral or a little beyond; latter small, equally distant from end of snout and from root of caudal. Caudal rounded-acuminate, longer than head. Caudal peduncle as long as deep. 28–30 scales in longitudinal series, 18 round body in front of ventrals; lateral line indicated by a series of

pits. Yellowish or pale olive, with large crimson spots; fins greyish, dorsal, anal, and caudal with crimson spots.

Total length 55 millim.

Portuguese Congo; mouth of Congo.

1. Type.	Lucola R. near Cabinda.	Dr. W. J. Ansorge (C.).
2. Ad.	Luculla R., Chiloango.	"
3-12. Ad. & hgr.	Luali R. at Lundo.	"
13-16. Ad.	Boma, Congo.	Mr. J. Paul Arnold (P.).

### 37. HAPLOCHILUS NIGRICANS.

Bouleng. Rev. Zool. Afr. ii. 1913, p. 160.

Depth of body  $4\frac{1}{2}$  to  $4\frac{2}{3}$  times in total length, length of head  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times. Head flat above; snout broad, rounded, as long as eye; mouth directed upwards; lower jaw slightly projecting; eye  $3\frac{1}{2}$  times in length of head,  $1\frac{1}{2}$  times in interorbital width; præorbital about  $\frac{1}{5}$  diameter of eye. Dorsal 9, originating about twice as far from head

Fig. 61.



*Haplochilus nigricans.*

Type.  $\frac{4}{3}$ .

as from root of caudal, above posterior third of anal, longest rays not much more than  $\frac{1}{2}$  length of head. Anal 15, longest rays  $\frac{2}{3}$  length of head. Pectoral a little shorter than head, extending to base of ventral or a little beyond; ventral small, equally distant from end of snout and from root of caudal. Caudal pointed, longer than head. Caudal peduncle slightly longer than deep. 28-29 scales in longitudinal series, 20 round body in front of ventrals; lateral line absent or represented by a few pits. Dark brown, with traces of longitudinal series of red spots on the sides; fins blackish.

Total length 47 millim.

Uelle River, Upper Congo.—Types in Congo Museum, Tervueren.

1. One of the types.	Dungu.	M. Hutereau (C.).
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## 38. HAPLOCHILUS MULTIFASCIATUS.

Bouleng. Bull. Soc. Nat. Luxemb. 1913, p. 43.

Depth of body 5 to  $5\frac{1}{4}$  times in total length, length of head  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times. Head flat above; snout broad, rounded, as long as eye; mouth directed upwards; lower jaw scarcely projecting; eye  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times in length of head,  $1\frac{1}{2}$  times in interorbital width; præorbital about  $\frac{1}{4}$  diameter of eye. Dorsal 8–9, originating twice as far from head as from root of caudal, above posterior fourth of anal, longest rays about  $\frac{1}{2}$  length of head. Anal 14–15, longest rays  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head. Pectoral  $\frac{2}{3}$  length of head, just reaching base of ventral; ventral small, equally distant from end of snout and from root of caudal. Caudal pointed, median rays sometimes produced, longer than head. Caudal peduncle as long as deep. 29–30 scales in longitudinal series, 20 round body in front of ventrals; lateral line indicated by a series of feeble pits. Pale brownish, with 7 blackish vertical bars, two above the anal and two on the caudal peduncle; narrower bars sometimes present

Fig. 62.



*Haplochilus multifasciatus*.

Type.  $\times 1\frac{1}{3}$ .

between the principal ones; two black bars across the chin; dorsal and caudal whitish, with small blackish spots; distal half of anal blackish, the bars of the body usually extending on its white basal half.

Total length 45 millim.

Kasai, Congo.—Types in Luxemburg Museum.

1–6. Types.

Kondue, Kasai.

M. E. Luja (C.).

7–12. Ad.

” ”

”

## 39. HAPLOCHILUS GRAHAMI.

Bouleng. Ann. & Mag. N. H. (8) viii. 1911, p. 267.

Depth of body 4 to  $4\frac{1}{2}$  times in total length, length of head 3 to  $3\frac{1}{2}$  times. Head flat above; snout broad, rounded, a little shorter than eye; mouth directed upwards; lower jaw projecting; eye 3 to  $3\frac{1}{2}$  times in length of head,  $1\frac{1}{2}$  times in interorbital width; præorbital barely  $\frac{1}{4}$  diameter of eye. Dorsal 7–8, originating about twice as far from



occiput as from root of caudal, above posterior fourth of anal, longest rays  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Anal 15–16, longest rays  $\frac{1}{2}$  to  $\frac{3}{4}$  length of head. Pectoral  $\frac{3}{4}$  length of head, extending beyond base of ventral; latter small, equally distant from end of snout and from root of caudal. Caudal pointed, longer than head. Caudal peduncle slightly longer than deep. 28–30 scales in longitudinal series, 20–22 round body in

Fig. 63.

*Haplochilus grahami.*♂, type.  $\frac{4}{3}$ .

front of ventrals; lateral line indicated by a series of pits. Yellowish or pale brownish, with or without small crimson spots; 5 to 7 blackish vertical bars on the body, some reaching the back, some confined to the lower half of the body; a black blotch at the base of the caudal fin; fins greyish (yellow in life), caudal with small purplish-brown spots.

Total length 53 millim.

Southern Nigeria.

1–5. Types.	Swamps near Lagos.	Dr. W. M. Graham (P.).
6. Ad.	Old Calabar.	Mr. J. Paul Arnold (P.).
7–8. Ad.	W. Africa.	Mr. E. Marré (P.).

#### 40. HAPLOCHILUS BIFASCIATUS.

Steind. Sitzb. Ak. Wien, lxxxiii. i. 1881, p. 199; Bouleng. Fish. Nile, p. 419, pl. lxxix. fig. 9 (1907).

Depth of body  $4\frac{1}{2}$  to  $5\frac{2}{3}$  times in total length, length of head  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times. Head flat above; snout as long as eye; mouth directed upwards, lower jaw scarcely projecting; eye 3 to 4 times in length of head,  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times in interorbital width; præorbital very narrow. Dorsal 6–7, originating twice as far from head as from root of caudal, above posterior third of anal; longest ray  $\frac{2}{3}$  to  $\frac{4}{5}$  length of head. Anal 15–16. Pectoral  $\frac{2}{3}$  to  $\frac{4}{5}$  length of head, reaching beyond base of ventral; latter small, equally distant from end of snout and from root of caudal. Caudal pointed, considerably longer than head. Caudal peduncle as long as deep. 27–28 scales in longitudinal series, 16–18 round body in

front of ventrals; lateral line indicated by a series of pits. Yellowish brown, with two more or less distinct brown bands along each side, the upper extending from above the gill-cover to the caudal peduncle, the lower from the eye to the caudal; breeding male brilliantly coloured with red, purple, and blue; fins whitish, yellowish, or greyish, unspotted or (male) with round red or orange spots on the caudal, the

Fig. 64.

*Haplochilus bifasciatus.*Mongalla (F. N.).  $\frac{3}{2}$ .

lower edge of which may be blackish; anal and ventrals also edged with blackish in the male.

Total length 45 millim.

White Nile, Bahr-el-Seraf, and Bahr-el-Gebel.—Types in Vienna Museum.

1-3. Ad.	Lake No.	H. H. King, Esq. (P.).
4. Ad.	Mongalla, near Gondokoro.	Dr. F. Werner (P.).

#### 41. HAPLOCHILUS CHEVALIERI.

Pellegr. Bull. Mus. Paris, 1904, p. 222.

Depth of body 4 to  $4\frac{1}{2}$  times in total length, length of head  $3\frac{1}{2}$  times. Head flat above; snout as long as or a little longer than eye; mouth directed upwards, lower jaw projecting; eye 3 times in length of head,  $1\frac{1}{2}$  times in interorbital width. Dorsal 7-8, originating 3 times as far from anterior border of eye as from root of caudal, above antepenultimate ray of anal. Anal 13-14. Pectoral  $\frac{2}{3}$  length of head, reaching base of ventral. Caudal pointed, median ray produced, longer than head. Caudal peduncle at least as deep as long. 27-28 scales in longitudinal series; lateral line indicated by a series of pits. Olive above, yellow on the sides and below; a dark line along the lower part of the sides and of the caudal peduncle; each scale on the sides with a carmine spot; jaws edged with carmine; fins yellow, dorsal, anal, and caudal finely dotted with carmine.

Total length 48 millim.

Congo (Stanley Pool).—Types in Paris Museum.

## 42. HAPLOCHILUS SINGA.

Bouleng. Ann. Mus. Congo, Zool. i. p. 113, pl. xlvii. fig. 1 (1899), and Poiss. Bass. Congo, p. 346 (1901).

Depth of body  $4\frac{1}{2}$  times in total length, length of head  $3\frac{2}{3}$  times. Head flat above; snout broad, as long as eye; mouth directed upwards, lower jaw projecting a little; eye  $3\frac{1}{2}$  times in length of head,  $1\frac{1}{2}$  times in interorbital width; præorbital very narrow. Dorsal 8, originating twice as far from eye as from root of caudal, above last rays of anal, longest rays  $\frac{3}{4}$  length of head in male. Anal 14. Pectoral a little shorter than head, extending a little beyond base of ventral; latter a little nearer end of snout than root of caudal. Caudal forked, upper and lower rays produced in the male. Caudal peduncle hardly longer than deep. 27–28 scales in longitudinal series, 20 round body in front

Fig. 65.

*Haplochilus singa.*

♂, type (A. M. C.).

of ventrals; lateral line represented by a series of pits. Olive-green, most of the scales with a carmine spot; fins greenish yellow, dorsal and caudal with series of carmine dots.

Total length 45 millim.

Congo.—Type in Congo Museum, Tervueren.

1. Ad.

Boma.

Dr. J. W. Todd (P.).

2–3. Ad.

Lindi R.

M. M. Storms (C.);

Brussels Museum (P.).

## 5. PROCATOPUS.

Bouleng. Ann. & Mag. N. H. (7) xiv. 1904, p. 20.

Teeth unicuspid, in a band, outer largest. Lower jaw projecting a little beyond upper. Body strongly compressed throughout; scales rather large, smooth, exposed surface regularly hexagonal, more than twice as deep as long on the middle lateral series. Dorsal fin shorter and originating further back than anal; latter with 14–17 rays. Ventral fins far forward, almost below the base of the pectorals, which are inserted very high up the sides. Vertebrae 29–30.

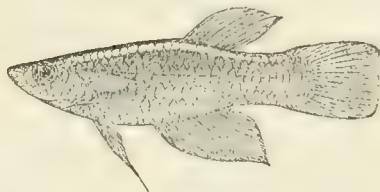
A single species.

1. PROCATOPUS NOTOTÆNIA.

Bouleng. l. c.

Body very strongly compressed, its depth equal to length of head and 3 to  $3\frac{1}{2}$  times in total length; upper surface of head and anterior part of back quite flat. Snout as long as eye, the diameter of which is 3 to  $3\frac{1}{2}$  times in length of head; mouth directed upwards, lower jaw projecting; interorbital width not quite half length of head; a long pointed fleshy process below the gill-cover, directed backwards. Dorsal 9-11, originating at equal distance from occiput and from root of caudal and above middle of base of anal; posterior ray longest,  $\frac{2}{3}$  to  $\frac{4}{5}$  length of head. Anal 14-17, longest rays, in third fourth, as long as head or a little shorter. Pectoral about  $\frac{3}{4}$  length of head. Ventral at least as

Fig. 66.



*Procatopus nototænia.*

Type.

long as head, outer ray produced into a filament. Caudal truncate, as long as head. Caudal peduncle as long as deep. 25-28 scales in a longitudinal series, 7 or 8 in a transverse series; no lateral line; exposed surface of scales regularly hexagonal, more than twice as deep as long on the middle lateral series. Pale yellowish olive above, yellowish white beneath; a bright yellow streak on each side of the back, from behind the superciliary edge to the base of the caudal fin, bordering the dorsal fin; an orange streak on the middle of the back, from the occiput to the origin of the dorsal fin; fins greyish, anal and caudal tinged with yellow at the base.

Total length 48 millim.

Cameroon to Lower Niger.

1-15. Types.	Tributary of Lobi R., S.	G. L. Bates, Esq. (C.).
	Cameroon.	
16-19. Ad.	Kribi R., S. Cameroon.	"
20-29. Ad. & hgr.	Cross R. district, Old Calabar.	Major W. A. C. Cockburn (P.).
30, 31. Skels.	" " "	"



- |                   |   |                               |
|-------------------|---|-------------------------------|
| 32. Ad.           | Bendi District, Cross R., Old Calabar.    | Major W. A. C. Cockburn (P.). |
| 33-34. Ad. & hgr. | Asaba, Lower Niger.                       | A. E. Kitson, Esq. (P.).      |
| 35. Hgr.          | River flowing into the Niger below Asaba. | Major G. E. Bruce (P.).       |

## 6. LAMPRICHTHYS.

Regan, Ann. & Mag. N. H. (8) vii. 1911, p. 325.

*Mohanga*, Bouleng. op. cit. viii. 1911, p. 261.

Teeth unicuspid, unequal in size, forming a band which is exposed when the mouth is closed. Upper jaw projecting a little beyond lower. Body strongly compressed throughout; scales moderately large, finely ctenoid. Dorsal much shorter than anal, which is produced far forward and contains 27-30 rays. Pectorals inserted rather high up. Ventrals a short distance behind vertical of base of pectorals. Vertebrae 41.

A single species.

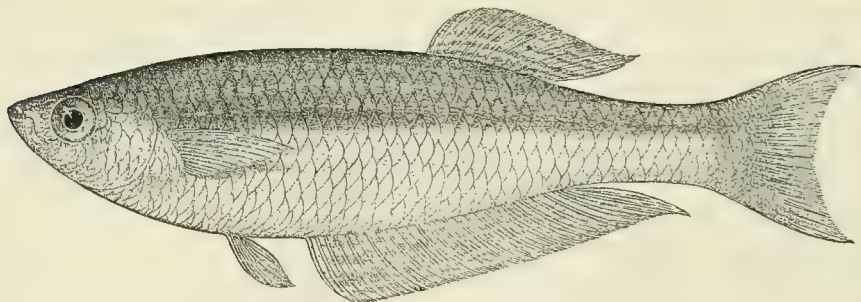
### 1. LAMPRICHTHYS TANGANICANUS.

*Haplochilus tanganicanus*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 25, pl. vi. fig. 3, and Poiss. Bass. Congo, p. 347 (1901); Steind. Sitzb. Ak. Wien, cxx. i. 1911, p. 1181.

*Mohanga tanganicana*, Bouleng. Ann. & Mag. N. H. (8) viii. 1911, p. 261.

Depth of body  $3\frac{1}{2}$  to  $4\frac{1}{3}$  times in total length, length of head  $4\frac{1}{3}$  to 5 times. Snout rounded, as long as or slightly shorter than eye, which

Fig. 67.



*Lamprichthys tanganicanus*.

Mpala.

is 3 to  $3\frac{2}{3}$  times in length of head and  $1\frac{1}{4}$  to  $1\frac{1}{3}$  times in interorbital width; præorbital about  $\frac{1}{3}$  diameter of eye, covered with strongly ctenoid scales. Dorsal 13-16, originating at equal distance from head

or occiput and from root of caudal, above anterior third or middle of anal; posterior rays longest,  $\frac{2}{3}$  to  $\frac{4}{5}$  length of head. Anal 27–30, posterior rays longest. Pectoral  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head. Ventrals rather small, twice as distant from end of snout as from root of caudal. Caudal feebly emarginate, basal half or two-fifths scaly. Caudal peduncle twice as long as deep. 40–45 scales in longitudinal series, 10–11 in transverse series; lateral line indicated by a series of pits. Olive above, silvery white beneath; uniform or each scale bearing a bluish spot; a more or less distinct dark lateral band; fins greyish.

Total length 135 millim.

Lake Tanganyika.

1. Type.	Mbity.	Prof. J. E. S. Moore (C.).
2–4. Ad.	Niamkolo.	Dr. W. A. Cunningham (C.).
5. Ad.	Moliro.	..
6–10. Ad.	Mpala.	..
11. Skel.	..	..
12. Ad.	Tulo.	Dr. L. Stappers (C.).

## Suborder VII. LOPHOBRANCHII.

Highly aberrant Teleosts with the body protected by bony rings or star-like ossifications. Air-bladder without pneumatic duct. Parietal bones absent. Gills not laminated, but composed of small rounded lobes, borne by slender and feebly ossified arches; only one or two branchiostegal rays. The three anterior vertebræ immovably joined together. Ventral fins abdominal, if present.

### Fam. 1. SYNGNATHIDÆ.

Bony armour in the form of rings. Anterior vertebræ not elongate; parapophyses strong, ankylosed to the exoskeleton. Snout tubiform; mouth small, toothless. Gill-opening very small. A single dorsal fin. No ventral fins.

The males carry the eggs attached to the lower surface of the body, or in an open or closed brood-pouch.

Mostly marine fishes, occurring on the coasts of the greater part of the world. Four genera have representatives in the fresh waters of Africa.

*Synopsis of the Genera.*

I. Tail not much longer, or even shorter, than head and body.

Greater part of dorsal fin on trunk; dorso-lateral edge  
of trunk not continuous with that of tail; male [p. 82.  
carrying the eggs on the belly . . . . . 1. *Belonichthys*, Peters,

Greater part of dorsal fin on tail; dorso-lateral edge of  
trunk not continuous with that of tail; male carry- [p. 83.  
ing the eggs on the belly . . . . . 2. *Doryichthys*, Kaup,

II. Tail much longer than head and body.

Greater part of dorsal fin on tail; dorso-lateral edge of  
trunk continuous with that of tail; male carrying [p. 84.  
the eggs on the belly . . . . . 3. *Calonotus*, Peters,

Whole or greater part of dorsal fin on tail; dorso-lateral  
edge of trunk not continuous with that of tail; [p. 86.  
male carrying the eggs in a subcaudal pouch . . 4. *Syngnathus*, Art.,

1. **BELONICHTHYS.**

Peters, Reise Mossamb. iv. p. 108 (1868); A. Dum. Hist. Poiss. ii. p. 586 (1870);

Duncker, Mitth. Nat. Mus. Hamb. xxix. 1912, p. 230.

*Doryichthys*, part., Günth. Cat. Fish. viii. p. 179 (1870).

Body slender, much elongate, with strong ridges, the dorso-lateral edge of the trunk not continuous with that of the tail. Dorsal fin principally on the trunk; anal rudimentary. Pectoral and caudal fins present. Brood-pouch of the male occupying the whole belly, not completely covering the eggs.

Brackish and fresh waters of East Africa and the Malay Archipelago.

I. **BELONICHTHYS ZAMBESENSIS.**

*Syngnathus fluviatilis* (non K. & v. H.), Peters, Mon. Berl. Ac. 1852, p. 685.

*Syngnathus zambezensis*, Peters, Mon. Berl. Ac. 1855, p. 465.

*Belonichthys zambezensis*, Peters, Reise Mossamb. iv. p. 109, pl. xx. fig. 5 (1868);

A. Dum. Hist. Poiss. ii. p. 587 (1870).

*Doryichthys mento*, part., Günth. Cat. Fish. viii. p. 181 (1870).

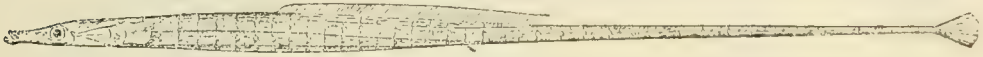
Head and body  $\frac{1}{2}$ , or a little less than  $\frac{1}{2}$ , of total length; bony rings 20+18-24, without spines; lateral line and lower caudal ridge continuous. Snout nearly as long as postocular part of head; operculum with granulate radiating ridges. Dorsal 66-69, on 15 rings, the last 4 of which belong to the tail. Anal 4. Pectoral and caudal fins well

developed. Yellowish brown, striolated with blackish; a dark streak on each side of the head, passing through the eye.

Total length 178 millim.

Lower Zambesi (Tette), and Molambi River, opposite to Mozambique Island.—Types in Berlin Museum.

Fig. 68.



*Belonichthys zambesensis.*

Type, after Peters (Reise Mossamb.).  $\frac{3}{4}$ .

## 2. DORYICHTHYS.

Kaup, Cat. Lophobr. Fish, p. 56 (1856); Günth. Cat. Fish. viii. p. 179 (1870), part.; Duncker, Mitth. Nat. Mus. Hamb. xxix. 1912, p. 229.

*Microphis* (non Hallow.), Kaup, op. cit. p. 63 \*; A. Dum. Hist. Poiss. ii. p. 588 (1870); Duncker, l. c.

Body slender, much elongate, with more or less distinctly serrated ridges, the dorso-lateral edge of the trunk not continuous with that of the tail. Greater part of dorsal fin on the tail; anal rudimentary. Pectoral and caudal fins present. Brood-pouch of the male occupying the whole belly, open.

Brackish and fresh waters of the tropical parts of the World. One species in Africa.

### 1. DORYICHTHYS SMITHII.

*Doryichthys*, sp., J. A. Smith, Proc. R. Phys. Soc. Edinb. iii. 1865, p. 227.

*Microphis smithii*, A. Dum. Hist. Poiss. ii. p. 599 (1870).

*Doryichthys lineatus*, part., Günth. Cat. Fish. viii. p. 183 (1870).

Head and body about  $\frac{3}{5}$  of total length; bony rings 21–22+22–24; body a little deeper than broad; bony plates with vertical striæ of granular asperities, the ridges serrated, the last serra on each ring enlarged into a spine, at least in the young; lateral line continuous with lower caudal ridge. Snout about  $2\frac{1}{2}$  times as long as postocular part of head; operculum crossed by a strong, straight ridge; two or three oblique, diverging ridges below it. Dorsal 42–48, on 9 or 10

\* *Microphis*, Kaup, Arch. f. Naturg. 1853, p. 234, is not accompanied by a definition, and must be regarded as a *nomen nudum*.



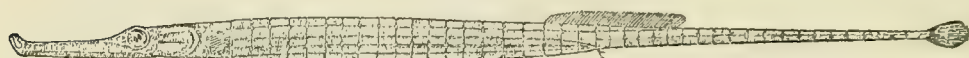
rings, 3 of which belong to the trunk. Anal 2-3. Pectoral and caudal fins well developed, but small. Brown; snout more or less distinctly spotted with black; tail sometimes with dark annuli; caudal blackish.

Total length 170 millim.

Niger to Congo.

1. Ad.	Degama, Lower Niger.	Dr. W. J. Ansorge (C.).
2. Type.	Old Calabar.	Dr. Hewan (C.); Dr. J. A. Smith (P.).
3-5. Ad.	Benito R.	G. L. Bates, Esq. (C.).
6. Ad.	Gaboon.	
7. Ad.	Fresh-water lagoon, Chiloango Town.	Dr. W. J. Ansorge (C.).

Fig. 69.



*Doryichthys smithii*.  
Benito R.  $\frac{5}{7}$ .

### 3. CÆLONOTUS.

Peters, Mon. Berl. Ac. 1855, p. 465, and Reise Mossamb. iv. p. 106 (1868); A. Dum. Hist. Poiss. ii. p. 541 (1870); Günth. Cat. Fish. viii. p. 188 (1870); Duncker, Mitth. Nat. Mus. Hamb. xxix. 1912, p. 230.  
*Hemithylacus*, Kaup, Cat. Lophobr. Fish, p. 61 (1856); A. Dum. t. c. p. 599.

Body slender, much elongate, the caudal part much elongate; only one pair of strong ridges, the dorsal, which are continuous on the trunk and tail. Dorsal fin partly on the trunk and partly on the tail. Anal very small. Pectoral and caudal fins present. Brood-pouch of the male occupying the whole belly, not completely covering the eggs.

Brackish and fresh waters of Madagascar, the Comoro Islands, and the Malay Archipelago.

Two species in Africa:—

Bony rings 17+38-39; D. 42, on 11 rings . . . 1. *C. argulus*, Peters, p. 85.  
Bony rings 17-18+32-35; D. 53-62, on 12-13  
rings . . . . . 2. *C. liaspis*, Blkr., p. 85.

## 1. CÆLONOTUS ARGULUS.

*Syngnathus argus* (non Richards.), Peters, Mon. Berl. Ac. 1852, p. 685.

*Cælonotus argulus*, Peters, Mon. Berl. Ac. 1855, p. 465, and Reise Mossamb. iv. p. 106, pl. xx. fig. 4 (1868); A. Dum. Hist. Poiss. ii. p. 541 (1870); Günth. Cat. Fish. viii. p. 189 (1870).

Head and body about  $\frac{3}{5}$  of total length; bony rings 17+33-39; only the latero-dorsal ridges well marked. Snout a little shorter than post-ocular part of head; operculum with radiating striæ and a straight

Fig. 70.

*Cælonotus argulus*.

Type, after Peters (Reise Mossamb.).  $\frac{3}{4}$ .

ridge on the anterior  $\frac{2}{3}$  of its length. Dorsal 42, on 11 rings, 3 of which belong to the trunk. Anal 4. Pectoral and caudal fins well developed. Brownish grey, with two superposed white ocellar spots with black centre on each side of each ring on the trunk and one on each side of each ring on the tail; a dark streak on each side of the snout; caudal fin blackish, with a lighter edge.

Total length 115 millim.

Mountain streams of Johanna, Comoro Islands.—Types in Berlin Museum.

Fig. 71.

*Cælonotus liaspis*.

Madagascar, after Sauvage (*l. c.*).

## 2. CÆLONOTUS LIASPIS.

*Syngnathus leiaspis*, Bleek. Verh. Batav. Gen. xxv. 1853, p. 20; A. Dum. Hist. Poiss. ii. p. 572 (1870).

*Hemithylacus leiaspis*, Kaup, Cat. Lophobr. Fish, p. 61 (1856); A. Dum. t. c. p. 599; Sauv. Hist. Madag., Poiss. p. 507, pl. 2. fig. 5 (1870).

*Cælonotus liaspis*, Günth. Cat. Fish. viii. p. 188 (1870).

*Hemithylacus goudotii*, Kaup, op. cit. p. 76.

*Cælonotus vaillanti*, Juillerat, Bull. Soc. Philom. (7) iv. 1880, p. 176; Sauv. op. cit. p. 508, pl. xlix. B. fig. 6.

Head and body about  $\frac{2}{3}$  of total length; bony rings 17-18+32-35;

dorsal ridges strong. Snout as long as postocular part of head; operculum without ridges. Dorsal 53-62, on 12 or 13 rings, 4 or 5 of which belong to the trunk. Otherwise as in the preceding species.

Total length 145 millim.

Madagascar; Java.—Types in Leyden Museum.

1-2. Ad.

Madagascar.

M. Majastre (C.).

#### 4. SYNGNATHUS.

Artedi, Synon. Pisc. p. 1 (1738), part.; A. Dum. Hist. Poiss. ii. p. 543 (1870); Günth. Cat. Fish. viii. p. 155 (1870); Duncker, Mitth. Nat. Mus. Hamb. xxix. 1912, p. 236.

Body slender, much elongate, with more or less distinct ridges, the dorsal lateral edge of the trunk not continuous with that of the tail. The whole or greater part of the dorsal fin on the tail; anal much reduced. Pectoral and caudal fins present. Brood-pouch of the male under the tail, the eggs covered by dermal folds meeting on the median line.

Seas of the temperate and tropical regions, a few species in fresh water. Of the latter, four occur in Africa:—

I. Lateral line and upper caudal ridge not continuous.

Operculum crossed by a straight ridge; snout

much longer than postocular part of head;

bony rings 14+33-34; D. 25-27 . . . . 1. *S. kaupi*, Blkr., p. 86.

Operculum crossed by a straight ridge; snout

as long as postocular part of head; bony

rings 15+37; D. 29 . . . . . 2. *S. ansorgii*, Blgr., p. 87.

II. Lateral line and upper caudal ridge continuous.

Operculum crossed by a straight ridge; snout

as long as postocular part of head; bony

rings 13+35; D. 25 . . . . . 3. *S. pulchellus*, Blgr., p. 88.

A short ridge on anterior part of operculum;

snout as long as or a little longer than post-

ocular part of head; bony rings 15-16+

33-35; D. 27-29 . . . . . 4. *S. algeriensis*, Playf., p. 88.

#### 1. SYNGNATHUS KAUPI.

Bleek. Nat. Verh. Vet. Haarlem, xviii. 1863, no. 2, p. 24, pl. iv. fig. 2; A. Dum.

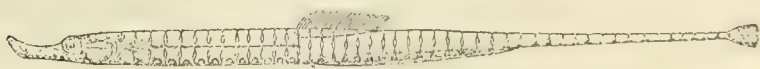
Hist. Poiss. p. 547 (1870); Günth. Cat. Fish. viii. p. 174 (1870); Steind.

Notes Leyd. Mus. xvi. 1894, p. 89.

Head and body about  $\frac{2}{5}$  of total length; bony rings 14+33-34,

without spines; body a little deeper than broad; lateral line and upper caudal ridge not continuous. Snout about  $1\frac{1}{2}$  times as long as postocular part of head; operculum crossed by a straight ridge; a ridge along the upper surface of the head and on the nape. Dorsal 25–27, originating above vent and occupying 7 rings. Anal 2–3. Pectoral and caudal fins well developed, but small. Pouch half as long as tail.

Fig. 72.



*Syngnathus kaupii*.  
Chiloango.

Dark brown, with more or less distinct light spots on the body; a regular series of yellowish dark-edged ocelli, one to each bony ring, on each side of the body, just above the ventro-lateral ridge; large light spots on each side of the brood-pouch; female with dark and light vertical bars on the sides of the head; caudal fin black, edged with yellowish above and beneath.

Total length 125 millim.

Coast of Guinea to Congo.—Type in Leyden Museum.

1. Hgr.	Degama, Lower Congo.	Dr. W. J. Ansorge (C.).
2–3. Ad.	Fresh-water lagoon near Chiloango Town.	„

## 2. SYNGNATHUS ANSORGII.

Bouleng. Ann. & Mag. N. H. (8) vi. 1910, p. 559.

Head and body  $\frac{1}{3}$  of total length; bony rings 15+37, without spines; body a little deeper than broad; lateral line and upper caudal ridge not continuous. Snout as long as postocular part of head; operculum

Fig. 73.



*Syngnathus ansorgii*.  
Type.

crossed by a straight ridge; a ridge along the upper surface of the head and on the nape. Dorsal 29, originating above vent and occupying 7 rings. Anal 2. Pectoral and caudal fins well developed, but small.



Pouch half as long as tail. Yellowish brown, darker on the tail, with rather indistinct dark brown bars above and blackish spots disposed regularly on the sides, one above and one below the median lateral ridge to each ring on the trunk; dark lines radiating from the pupil; caudal fin black, edged with yellowish above and beneath.

Total length 115 mm.

Quanza River, Angola.

1. Type. Quanza R. at Dondo. Dr. W. J. Ansorge (C.).

### 3. SYNGNATHUS PULCHELLUS, sp. n.

Head and body slightly more than  $\frac{1}{3}$  of total length; bony rings 13+35, without spines; body a little deeper than broad; lateral line and upper caudal ridge continuous. Snout as long as postocular part of head; operculum crossed by a straight ridge; a ridge along the upper surface of the head and on the nape. Dorsal 25, originating above vent and occupying 6 rings. Anal 2. Pectoral and caudal fins

Fig. 74.



*Syngnathus pulchellus*.

Type, Gaboon.

well developed, but small. Pouch half as long as tail. Brown; above with small darker spots and lighter, dark-edged cross-bars, which are closer together on the tail than on the trunk; a series of square dark brown spots, one to each ring, on each side below the lateral line; eye and operculum with radiating dark brown lines; caudal fin yellowish, variegated with black.

Total length 135 millim.

Gaboon, Cameroon.

1. Type. Gaboon.  
2. „ Cameroon.

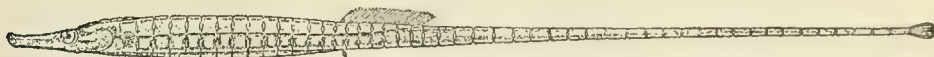
### 4. SYNGNATHUS ALGERIENSIS.

Playf. in Günth. Cat. Fish. viii. p. 164 (1870), and Ann. & Mag. N. H. (4) viii. 1871, p. 393.

Head and body  $\frac{2}{5}$  to  $\frac{3}{7}$  of total length; bony rings 15-16+33-35, without spines; body deeper than broad; lateral line and upper caudal

ridge continuous. Snout as long as or a little longer than postocular part of head; a short ridge on the anterior part of the operculum; a ridge along the upper surface of the head and on the nape. Dorsal 27–29, originating above vent and occupying 7 rings. Anal 2. Pectoral

Fig. 75.

*Syngnathus algeriensis.*

Type.

and caudal fins well developed, but small. "Pouch half as long as tail."\* Brown to blackish, with more or less regular series of white dots, brown spots, and irregular patches.

Total length 115 millim.

Fresh waters of Algeria; Lake Menzaleh, Egypt.

1–3, 4. Types.	Confluence of the Wed Cherif and the Wed Bou-Hamdan, Prov. Constan- tine, 60 miles from the sea.	Sir L. Playfair (P.).
5. Ad.	L. Menzaleh.	Dr. J. C. Mitchell (P.).
6–7. Ad.	„	L. Loat, Esq. (C.).

### Suborder VIII. ACANTHOPTERYGII.

Air-bladder without open duct. Supraoccipital bone separating the parietals, in contact with the frontals. Pectoral arch suspended from the skull; no mesocoracoid. Ventral fins thoracic or jugular, or, if abdominal, usually connected with the pectoral arch at least by ligament. Gill-opening usually large. Part of the dorsal and anal fins usually formed of spines, or of non-articulated rays.

#### *Synopsis of the Families.*

- I. Ventral fins inserted below or a little behind vertical of base of pectorals.
  - A. No superbranchial cavity.
    1. Ventral fins, if fully developed, with one spine and five soft rays; anal fin with pungent spine or spines; scapula and coracoid large.

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\* The male specimen on which this statement in the original description is based is no longer in the Museum.

- a.* Rays of the caudal fin not strongly forked at the base ; dorsal fin with pungent spines. (PERCIFORMES.)
- α.* Two nostrils on each side.
- \* Palate toothed.
- No subocular shelf † ; entopterygoid present ; soft portion of dorsal fin not more developed than that of anal ; latter with 3 spines or more . . . 1. CENTRARCHIDÆ, p. 91.
- No subocular shelf ; no entopterygoid ; soft portion of dorsal fin not more developed than that of anal ; latter with 3 spines or more . . . . 2. NANDIDÆ, p. 99.
- A subocular shelf ; entopterygoid present ; soft portion of dorsal fin usually not much more developed than anal ; latter with 3 spines . . . 3. SERRANIDÆ, p. 101.
- A subocular shelf ; entopterygoid present ; dorsal and anal fins thickly scaled, latter with 3 spines. 5. SCORPIDIDÆ, p. 119.
- \*\* Palate toothless.
- A subocular shelf ; anal fin very much shorter than the soft dorsal and with 1 or 2 spines . . . 4. SCIÆNIDÆ, p. 115.
- No subocular shelf ; anal fin as long as or shorter than the soft dorsal and with 3 spines . . . 6. PRISTIPOMATIDÆ, p. 125.
- A subocular shelf ; anal fin not much shorter than the soft dorsal and with 3 spines ; teeth in the jaws usually either cutting in front or molar-like on the sides . . . . . 7. SPARIDÆ, p. 132.
- β.* A single nostril on each side ; palate toothless.
- No subocular shelf ; lower pharyngeal bones united ; anal fin with 3 spines or more . . . . . 8. CICHLIDÆ, p. 133.
- b.* Rays of the caudal fin strongly forked at the base, embracing a considerable portion of the hypural. (SCOMBRIFORMES.)
- Dorsal spines few, or slender or rudimentary ; usually a pair of anal spines separated from the rest of the fin . . . . . 9. CARANGIDÆ ‡.
2. Ventral fins with one spine and 6 to 8 soft rays, or with 5 to 7 soft rays and no spine ; scapula and coracoid large. (ZEORHOMBI.)
- Head asymmetrical, the skull twisted in front, with the two orbits on one side ; fins without spines. 10. PLEURONECTIDÆ.
3. Ventral fins with one feeble spine and 4 or 5 soft rays, or united ; scapula and coracoid more or less reduced or even vestigial. (GOBIIFORMES.)
- Anterior part of dorsal fin composed of a few feeble, flexible spines . . . . . 11. GOBIIDÆ.

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† Inward process of the suborbitals supporting the eye.

‡ This and the following families will be dealt with in the Fourth Volume.

## B. A superbranchial cavity. (LABYRINTHICI.)

- Pelvic bones ankylosed to clavicles ; dorsal, anal,  
and ventral fins with spines . . . . . 12. OSPHROMENIDÆ.
- Pelvic bones connected with clavicles by ligament ;  
dorsal, anal, and ventral fins with spines . . . 13. ANABANTIDÆ.
- Pelvic bones connected with clavicles by ligament ;  
fins without spines . . . . . 14. OPHIOCEPHALIDÆ.

## II. Ventral fins inserted much behind vertical of base of pectorals.

## A. Ventral fins with one spine and 5 soft rays ; two dorsal fins, well separated from each other. (PERCESOCES.)

## 1. Pectoral fin inserted high up the side.

- Pelvic bones free or connected with the clavicles by  
ligament ; teeth conical . . . . . 15. ATHERINIDÆ.

- Pelvic bones suspended from the postclavicles ;  
teeth minute, setiform, or absent . . . . . 16. MUGILIDÆ.

## 2. Pectoral fin much nearer the ventral than the dorsal outline of the body.

- Pelvic bones suspended from the postclavicles ;  
pectoral fin with a lower portion consisting of  
free rays . . . . . 17. POLYNEMIDÆ.

- Pelvic bones not connected with scapular arch ;  
dentition very powerful . . . . . 18. SPHYRÆNIDÆ.

## B. Ventral fins reduced to one spine and one or two soft rays. (GASTROSTEI.)

- No scales ; dorsal fin with isolated spines . . . . 19. GASTROSTEIDÆ.

## III. Ventral fins in front of vertical of base of pectorals. (JUGULARES.)

- Ventral fins with not more than 4 rays ; body naked  
or with very small scales . . . . . 20. BLENNIIDÆ.

## Family 1. CENTRARCHIDÆ.

Perciform fishes with the suborbitals not produced into a subocular lamina, with teeth on the palate, separate lower pharyngeal bones, gill-membranes free from isthmus, 5 to 7 branchiostegal rays, and two nostrils on each side. Spinous dorsal well developed ; soft portion of dorsal not more developed than anal ; latter with 3 or more spines. Præcaudal vertebræ with transverse processes from the third or fourth to the last ; ribs, all but the last or last two sessile, inserted on the centrum behind the transverse process.

Fresh and brackish waters of North America. The genus *Kuhlia* irregularly distributed over the coasts of East and South Africa, the



North and East Coasts of Australia, and the islands of the Indian and Pacific Oceans, some species being exclusively marine, others occurring principally in fresh and brackish waters.

### 1. KUHLIA.

*Dules*, part., Cuv. & Val. Hist. Poiss. iii. p. 111 (1829); Günth. Cat. Fish. i. p. 266 (1859).

*Kuhlia*, Gill, Proc. Ac. Philad. 1861, p. 48; Bouleng. Cat. Fish. i. p. 35 (1895).

*Moronopsis*, Gill, op. cit. 1863, p. 82.

*Boulengerina* (non Dollo), H. W. Fowler, Proc. Ac. Philad. lviii. 1906, p. 512.

*Safale*, Jord. Proc. U.S. Nat. Mus. xlii. 1912, p. 655.

Body oblong, strongly compressed; scales moderate or large, ciliated; lateral line complete. Mouth large, protractile; maxillary exposed, without supplemental bone; teeth in jaws in villiform bands; teeth on vomer, palatines, entopterygoids, and ectopterygoids; præorbital and præoperculum denticulate; operculum with two spines. 6 branchiostegal rays; pseudobranchiæ large. Dorsal with 10 spines, anal with 3, both fins with a scaly sheath at the base. Vertebrae 25 (10-11+14-15).

3 or 4 species appear to be represented in African fresh waters. It is doubtful whether *K. tæniura* should be included, as, in the South Pacific, its habitat is believed to be confined to the sea, about reefs.

### *Synopsis of the Species.*

- I. 40-45 scales in lateral line; middle rays of caudal  $\frac{2}{3}$  to  $\frac{3}{4}$  length of outer; 17-18 gill-rakers on lower part of anterior arch; body spotted. . . . . 1. *K. rupestris*, Lacep., p. 93.

- II. 50-56 scales in lateral line; middle rays of caudal less than  $\frac{1}{2}$  length of outer; 23-28 gill-rakers on lower part of anterior arch; body not spotted.

- A. 9-11 soft rays in dorsal, 10-11 in anal; length of head  $2\frac{1}{2}$  to  $3\frac{1}{4}$  times in total length.

- Base of anal not or but slightly longer than its distance from caudal, which bears five black bands, one in the middle and two on each lobe. . . . . 2. *K. tæniura*, C. & V., p. 95.

- Base of anal considerably longer than its distance from caudal, which has a blackish posterior edge. . . . . 3. *K. malo*, C. & V., p. 96.

- B. 11-13 soft rays in dorsal, 12-13 in anal; length of head  $3\frac{3}{4}$  to 4 times in total length. . . . . 4. *K. caudovittata*, Lacep., [p. 98.]

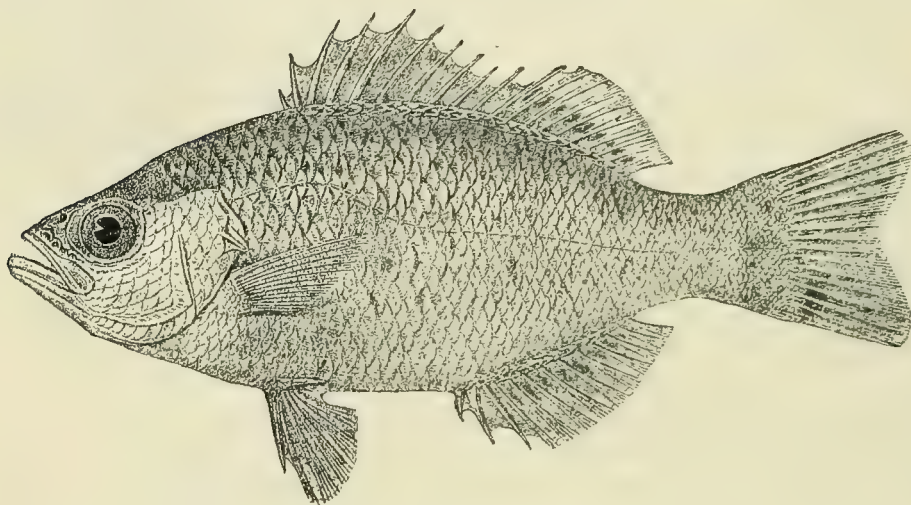
1. KUHLIA RUPESTRIS.

- Centropomus rupestris*, Lacep. Hist. Poiss. iv. pp. 252 & 273 (1802).  
*Perca ciliata*, Cuv. & Val. Hist. Poiss. ii. p. 52 (1828).  
*Dules fuscus*, Cuv. & Val. op. cit. iii. p. 118 (1829); Peters, Mon. Berl. Ac. 1855, p. 432; Günth. Cat. Fish. i. p. 268 (1859); Peters, Reise Mossamb. iv. p. 10 (1868); Sauv. Hist. Madag., Poiss. p. 149, pl. xv. fig. 4 (1891).  
*Dules rupestris*, Cuv. & Val. t. c. p. 119, and vii. p. 477 (1831); Bleek. Nat. Tijdschr. Nederl. Ind. vi. 1854, p. 209; Günth. t. c. p. 268; Sauv. op. cit. p. 150, pl. xli. B. fig. 3.  
*Dules guamensis*, Cuv. & Val. op. cit. vii. p. 474; Hombr. & Jacq. in Dumont d'Urv. Voy. Pôle Sud, Poiss. pl. iii. fig. 1 (1846); Günth. t. c. p. 269; Macleay, Proc. Linn. Soc. N.S.W. viii. 1883, p. 257.  
*Dules vanicolensis*, Cuv. & Val. t. c. p. 478; Hombr. & Jacq. l. c. fig. 2.  
*Percichthys ciliata*, Günth. t. c. p. 62.  
*Kuhlia ciliata*, Gill, Proc. Ac. Philad. 1861, p. 48.  
*Paradules rupestris*, Bleek. Nederl. Tijdschr. Dierk. ii. 1865, p. 276.  
*Moronopsis rupestris*, Bleek. Arch. Néerl. vii. 1872, p. 379, and Atl. Ichthyol. vii. p. 121, pl. cccxlix. fig. 2 (1876).  
*Dules marginatus*, Day, Fish. Ind. p. 67, pl. xviii. fig. 1 (1875).  
*Dules haswellii*, Macleay, Proc. Linn. Soc. N.S.W. v. 1880, p. 359.  
*Moronopsis fuscus*, Steind. Sitzb. Ak. Wien, lxxxii. i. 1881, p. 240.  
*Kuhlia rupestris*, Bouleng. Cat. Fish. i. p. 36 (1895); Pfeff. Thierw. O.-Afr., Fische, p. 3, fig. (1896); Seale, Occas. Pap. B. P. Bishop Mus. i. 1903, p. 75; Regan, Proc. Zool. Soc. 1913, p. 375.  
*Kuhlia rupestris hedleyi*, Douglas Ogilby, Proc. Linn. Soc. N.S.W. xxii. 1897, p. 767.  
*Kuhlia caerulea*, Regan, t. c. p. 376, fig.  
*Kuhlia sauvagii*, Regan, t. c. p. 377.

Depth of body  $2\frac{1}{2}$  to 3 times in total length, length of head  $2\frac{3}{4}$  to  $3\frac{1}{4}$  times. Snout as long as or a little shorter than diameter of eye, which is  $3\frac{1}{4}$  to 5 times in length of head; interorbital width 3 to  $3\frac{1}{2}$  times in length of head; lower jaw projecting; maxillary extending to below anterior third, centre, or posterior third of eye, the width of its distal extremity  $\frac{1}{3}$  to  $\frac{2}{3}$  diameter of eye; top of head rugose; cheek and opercle with large ciliated scales; lower border of præoperculum finely denticulate, entire in old specimens; lower opercular spine strong, usually much stronger than upper. Gill-rakers 17 or 18 on lower part of anterior arch. Dorsal X 11, originating above or just behind vertical of axilla; fifth, or fourth and fifth spines longest,  $\frac{1}{3}$  to  $\frac{3}{5}$  length of head, shorter than anterior soft rays; last spine much longer than penultimate, as long as

or a little shorter than third. Anal III 10, longer than its distance from caudal; third spine a little longer than second,  $\frac{1}{2}$  to  $\frac{3}{4}$  length of longest soft rays. Pectoral  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Caudal emarginate; middle rays  $\frac{2}{3}$  to  $\frac{3}{4}$  length of outer. Scales 40-45<sup>5-6</sup><sub>10-11</sub>. Bluish or olive above, silvery beneath, some or all of the scales with a blackish or reddish-brown

Fig. 76.

*Kulia rupestris.*

Madagascar, after Sauvage (*op. cit.*).

spot; round dark spots usually present at the base of the anal fin; part of the soft dorsal brown or blackish; caudal brown or blackish at least at the end, with a more or less distinct light edge.

Total length 400 millim.

East Africa, Madagascar and Mascarene Islands to the Malay Archipelago and Islands of the South Pacific \*.—Type in Paris Museum.

1-3. Ad. & hgr.	Zanzibar.	Sir L. Playfair (P.).
4. Type of <i>K. sauragii</i> .	Imerina, Madagascar.	Rev. R. Baron (C.).
5. Hgr.	Mauritius.	Zoological Society.
6-10. Ad., hgr., & yg.	Rodriguez.	J. Gulliver, Esq. (C.).
11. Skel.	"	"

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\* In the case of this and other widely distributed species, not confined to fresh waters, only the African specimens in the Collection are enumerated here.

2. KUHLIA TÆNIURA.

*Dules tæniurus*, Cuv. & Val. Hist. Poiss. iii. p. 114 (1829) ; Bleek. Verh. Batav. Gen. xxii. 1849, Perc. p. 49 ; Günth. Cat. Fish. i. p. 267 (1859) ; Kner, Novara, Fische, p. 47 (1865).

*Perca argentea*, Benn. Fish. Ceylon, pl. xxii. (1830).

*Dules bennetti*, Peters, Mon. Berl. Ac. 1855, p. 432 ; Günth. t. c. p. 270.

*Dules argenteus*, Klunz. Verh. zool.-bot. Ges. Wien, xx. 1870, p. 62 ; Günth. Fische Südsee, p. 25, pl. xix. fig. C (1873) ; Day, Fish. Ind. p. 67, pl. xviii. fig. 2 (1875) ; Waite, Proc. Linn. Soc. N.S.W. (2) ix. 1894, p. 217.

*Paradules tæniurus*, Bleek. Nederl. Tijdschr. Dierk. iv. 1871, p. 139.

*Moronopsis tæniurus*, Bleek. Arch. Néerl. vii. 1872, p. 74, and Atl. Ichthyol. vii. p. 119, pl. cccxlv. fig. 5 (1876).

*Moronopsis argenteus*, Klunz. Fische Roth. Meer. p. 25 (1884).

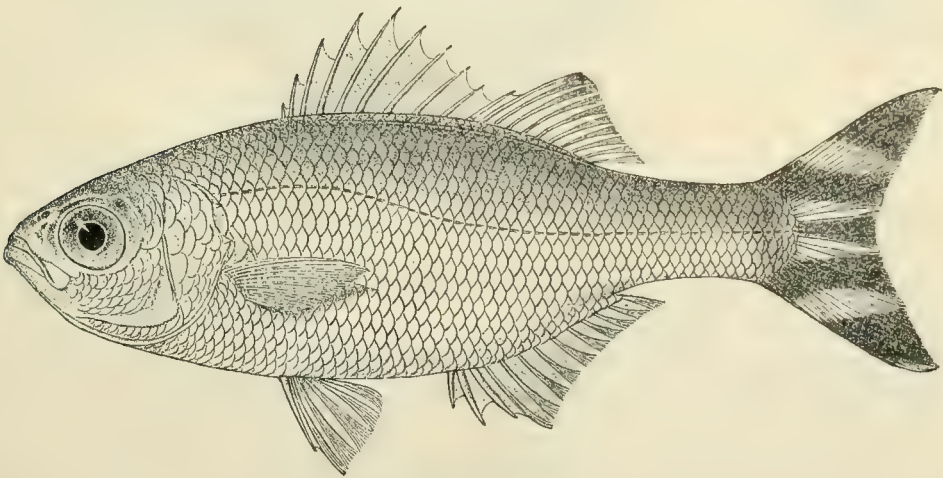
*Kuhlia arge*, Jord. & Bollm. Proc. U.S. Nat. Mus. xii. 1889, p. 159 ; Jord. & Eigenm. Bull. U.S. Fish. Comm. viii. 1890, p. 419.

*Kuhlia tæniura*, Jord. & Bollm. l. c. ; Bouleng. Cat. Fish. i. p. 39 (1895) ; Jord. & Everm. Bull. U.S. Fish. Comm. xxiii. 1905, p. 202, fig. ; Regan, Proc. Zool. Soc. 1913, p. 381.

*Kuhlia sterneckii*, Steind. Sitzb. Ak. Wien, cvii. i. 1898, p. 461, pl. —.

Depth of body  $2\frac{2}{3}$  to 3 times in total length, length of head  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times. Snout  $\frac{2}{3}$  diameter of eye, which is  $2\frac{2}{3}$  to  $3\frac{1}{4}$  times in length of

Fig. 77.



*Kuhlia tæniura*.  
Mauritius.  $\frac{2}{3}$ .

head and equals interorbital width ; lower jaw projecting ; maxillary extending to below anterior border or anterior third of eye, the width of its distal extremity  $\frac{1}{4}$  to  $\frac{1}{3}$  diameter of eye ; cheek and opercle with



large ciliated scales; angle and lower border of præoperculum finely denticulated; lower opercular spine long. 23 to 26 gill-rakers on lower part of anterior arch. Dorsal X 9-11, originating just behind vertical of axilla; fifth or fourth and fifth spines longest,  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head, longer than anterior soft rays; tenth spine as long as or longer than ninth, as long as third or shorter. Anal III 10-11, as long as or slightly longer than its distance from caudal; third spine a little longer than second, as long as tenth dorsal. Pectoral  $\frac{2}{3}$  length of head. Caudal deeply forked, median rays  $\frac{1}{3}$  to  $\frac{2}{3}$  length of outer. Scales 50-55  $\frac{5}{13-14}$ . Silvery, bluish grey on the back; top of soft dorsal blackish; caudal with five black bands, one along the middle rays and two pairs converging posteriorly; young with a dark streak on each side of the back, below the base of the dorsal.

Total length 200 millim.

East Africa, Islands of Indian and Tropical Pacific Oceans, New South Wales.—Type in Paris Museum.

1-2. Hgr.	Socotra.	Prof. I. B. Balfour (C.).
3-5. Yg	Mombasa.	A. Blayney Percival, Esq. (P.).
6. Yg.	Zanzibar.	Sir J. Kirk (C.).
7. Ad.	Seychelles.	S. Ward, Esq. (P.).
8-9. Hgr.	Port Natal.	Mr. T. Ayres (C.).
10. Hgr.	S. Africa?	Sir A. Smith (P.).
11. Ad.	Mauritius.	Royal College of Surgeons.

### 3. KUHLIA MALO.

*Dules malo*, Cuv. & Val. Hist. Poiss. vii. p. 479 (1831); Günth. Cat. Fish. i. p. 270 (1859).

*Dules mato*, Less. Voy. Coquille, Zool. ii. p. 223 (1831); H. W. Fowler, Proc. Ac. Philad. lviii. 1906, p. 512.

*Dules marginatus*, part., Günth. Fische Südsee, p. 24 (1873).

*Moronopsis argenteus*, var. *sandvicensis*, Steind. Sitzb. Ak. Wien, lxxiv. i. 1876, p. 205.

*Dules humilis*, De Vis, Proc. Linn. Soc. N.S.W. ix. 1884, p. 396.

*Moronopsis sandvicensis*, Steind. Sitzb. Ak. Wien, xevi. i. 1887, p. 56, pl. i. fig. 1.

*Kuhlia malo*, Bouleng. Cat. Fish. i. p. 40 (1895); Steind. Denkschr. Ak. Wien, lxx. 1900, p. 483; Jord. & Everm. Bull. U.S. Fish. Comm. xxiii. 1905, p. 207.

*Dules marginatus boninensis*, H. W. Fowler, t. c. p. 510, fig.

*Kuhlia humilis*, Douglas Ogilby, Ann. Queensl. Mus. x. 1911, p. 46, pl. vi. fig. 1; Regan, Proc. Zool. Soc. 1913, p. 380, fig.

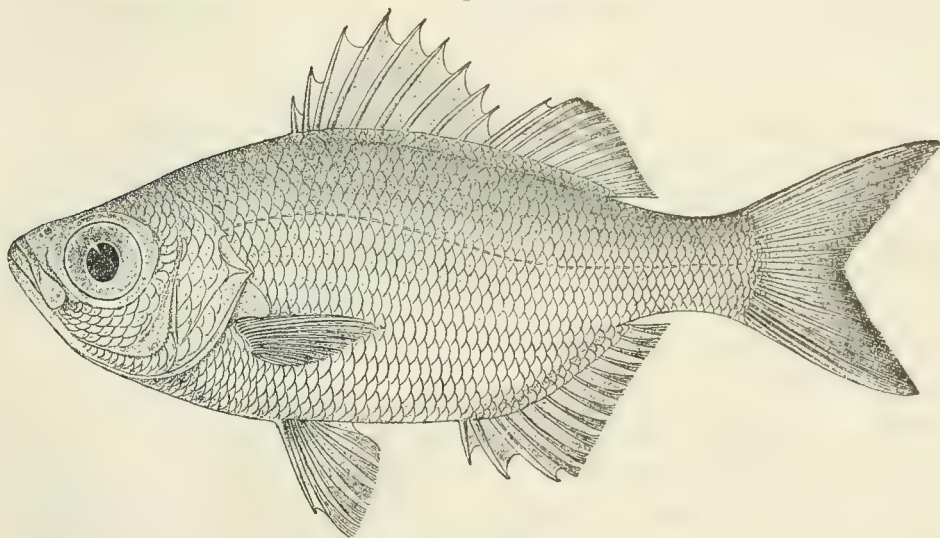
*Kuhlia proxima*, Kendall & Goldsbor. Mem. Mus. Comp. Zool. xxvi. 1911, p. 282, pl. iii. fig. 2.

*Kuhlia sandvicensis*, Kendall & Radcl. op. cit. xxxv. 1912, p. 106; Regan, t. c p. 381.

*Kuhlia splendens*, Regan, t. c. p. 379, fig.\*

Depth of body  $2\frac{1}{2}$  to  $3\frac{1}{4}$  times in total length, length of head 3 to  $3\frac{2}{3}$  times. Snout  $\frac{1}{2}$  to  $\frac{2}{3}$  diameter of eye, which is  $2\frac{1}{2}$  to 3 times in length of head; interorbital width 3 times in length of head; lower jaw projecting; maxillary extending to below anterior border or anterior fourth of eye, the width of its distal extremity  $\frac{1}{4}$  to  $\frac{1}{3}$  diameter of eye; cheek and opercle with large ciliated scales; angle and lower border of

Fig. 78.



*Kuhlia malo*.  
Rodriguez.

præoperculum finely denticulated; lower opercular spine strong. 25 to 28 gill-rakers on lower part of anterior arch †. Dorsal X 11, originating just behind vertical of axilla; fifth or fourth and fifth spines longest,  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head, as long as or a little longer than anterior soft rays; tenth spine longer than ninth, as long as or a little shorter than third. Anal III 11-12, much longer than its distance from the caudal;

\* In the only specimen in which the caudal fin is intact, the median rays measure 12 millim. and the longest 28, exactly in the same proportion as in the type of *K. boninensis* figured by Fowler.

† 21 in the type of *K. boninensis* (*fide* Fowler) which otherwise agrees very closely with our specimen from Rodriguez.

third spine as long as or a little shorter or a little longer than last dorsal. Pectoral  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head. Caudal deeply forked, median rays  $\frac{1}{3}$  to a little less than  $\frac{1}{2}$  length of outer. Scales 50–56  $\frac{5-7}{14-15}$  \*. Silvery, back darker; caudal with blackish posterior edge.

Total length 235 millim.

Islands of the Indian and Tropical Pacific Oceans, and Queensland.—No type in existence, the species being founded on a drawing of a specimen from fresh-waters of Tahiti †.

1–2, 3. Types of <i>K.</i>	Rodriguez, fresh water.	G. Gulliver, Esq. (P.).
	<i>splendens</i> .	
4. Skel.	" "	" "
5. Type of <i>K. splendens</i> .	Mauritius.	Chatham Museum.
6. Ad., stffed.	S. Africa (?).	Sir A. Smith (P.).

#### 4. KUHLIA CAUDOVITTATA.

*Holocentrus caudavittatus*, Lacep. Hist. Poiss. iv. pp. 332 & 367 (1802).

*Dules caudavittatus*, Cuv. & Val. Hist. Poiss. iii. p. 117 (1829), and vii. p. 475 (1831); Günth. Cat. Fish. i. p. 267 (1859); Sauv. Hist. Madag., Poiss. p. 151, pl. xviii. fig. 3 (1891).

*Kuhlia caudovittata*, Bouleng. Cat. Fish. i. p. 41 (1895); Regan, Proc. Zool. Soc. 1913, p. 379.

*Kuhlia boninensis* (non Fowler), Regan, t. c. p. 378.

Depth of body  $2\frac{3}{5}$  to 3 times in total length, length of head  $3\frac{3}{4}$  to 4 times. Length of snout  $\frac{2}{3}$  diameter of eye, which is 3 times in length of head and equals interorbital width; lower jaw projecting; maxillary extending to below anterior border or anterior third of eye, the width of its distal extremity nearly  $\frac{1}{3}$  diameter of eye; cheek and opercle with large ciliated scales; angle and lower border of præoperculum finely denticulated; lower opercular spine strong. 25 to 28 gill-rakers on lower part of anterior arch ‡. Dorsal X 11–13 §, originating just behind vertical of axilla; fifth spine longest,  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head, longer than

\* 4 scales from sheath at base of spinous dorsal to lateral line in the specimens here recorded, 4 to 6 in specimens from the Sandwich Islands.

† The identification of *Dules malo* will ever be a matter of uncertainty, but I cannot follow Kendall and Goldsborough in transferring the name to a fish with large black spots.

‡ 27 in the specimen from Tahiti preserved in the Museum.

§ The statement in the original description that 14 soft rays are present in the dorsal is no doubt due to the last being split to the base and reckoned as two, according to the custom of early ichthyologists. The specimens from Mauritius which I have examined in the Paris Museum have not more than 13.

anterior soft rays; tenth spine not or but very slightly longer than ninth. Anal III 12–13, longer than its distance from caudal. Pectoral  $\frac{2}{3}$  length of head. Caudal deeply forked, middle rays not more than  $\frac{2}{5}$  length of outer. Scales 52–55  $\frac{5-6}{14-16}$ . Silvery, bluish grey on the back; caudal black-edged and with an angular blackish band within the border.

Total length 190 millim.

Madagascar, Mascarene Islands, Society Islands, and probably other islands in the South Pacific.—Type believed to be lost.

## Family 2. NANDIDÆ.

Perciform fishes with the suborbitals not produced into a subocular lamina, with teeth on the palate, no entopterygoid, separate lower pharyngeal bones, gill-membranes free from isthmus, 6 branchiostegal rays, and two nostrils on each side. Spinous dorsal well developed; soft portion of dorsal not more developed than anal; latter with 3 or more spines. Præcaudal vertebræ with transverse processes from the seventh or eighth; ribs mostly sessile, behind the transverse processes.

Fresh waters of West Africa, South-Eastern Asia, and South America.

### 1. POLYCENTROPSIS.

Bouleng. Proc. Zool. Soc. 1901, i. p. 8.

Body short, elevated, very strongly compressed; scales moderately large, ciliated; lateral line incomplete, reduced to a few tubes. Mouth large, extremely protractile, the ascending processes of the præmaxillaries extremely long and extending to the occipital region; villiform bands of very small teeth in the jaws, on the vomer, and on the palatines; anterior nostril tubular; head for the greater part covered with scales; præorbital, præoperculum, and interoperculum serrated; operculum ending in a spine. No pseudobranchiæ. Dorsal and anal fins nearly equally developed, with scaly sheath at the base, the former with 15 to 17, the latter with 9 to 12 strong spines, the soft portion much reduced. Ventrals below the pectorals, close together, with a strong spine. Vertebræ 23 (10+13).

West Africa.

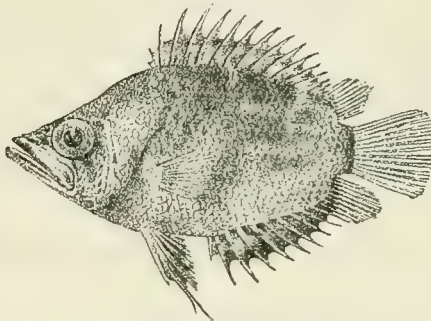


## 1. POLYCENTROPSIS ABBREVIATA.

Bouleng. l. c. pl. iii. fig. 2 ; Pellegr. Bull. Soc. Philom. (9) ix. 1907, p. 34.

Depth of body twice in total length, length of head  $2\frac{1}{3}$  to  $2\frac{1}{2}$  times. Snout acutely pointed, chin projecting ; eye as long as or a little longer than snout or interorbital width, nearly 3 to  $3\frac{1}{3}$  times in length of head ; maxillary extending to below centre or posterior third of eye ; 6 to 9 series of scales on the cheek. 9 to 11 gill-rakers on lower part of anterior arch, shorter than gill-laminæ. Dorsal XV–XVII 9–11 ; spines increasing in length to the fourth or fifth and decreasing from the seventh or eighth, longest  $\frac{1}{2}$  length of head and a little longer than soft rays. Anal IX–XII 8–9. Pectoral  $\frac{1}{2}$  length of head. Ventral longer, produced into a filament, extending beyond origin of anal. Caudal

Fig. 79.

*Polycentropsis abbreviata.*

Type (P. Z. S. 1901).

truncate. Caudal peduncle extremely short. Scales  $31-35 \frac{4}{17-19}$  ; lateral line 4–6. Pinkish brown, uniform or marbled with darker ; spinous dorsal and anal dark brown, with darker and lighter spots and edged with black ; ventrals blackish ; soft dorsal and anal, and caudal white, blackish, edged with pink, at the base.

Total length 80 millim.

Lagos, Niger, Ogowe.

1. Type.	Mouth of Ethiop R., Niger Delta.	Dr. W. J. Ansorge (C.).
2. Skel.	" " "	"
3–6. Ad. & hgr.	Oguta, Low. Niger.	"
7. Yg.	Abo, "	"
8. Ad.	Assay, "	J. S. Budgett, Esq. (P.).
9–10. Ad.	Low. Niger.	Mr. J. Paul Arnold (P.).
11. Hgr.	Lagos.	Sir A. Moloney (P.).

## Fam. 3. SERRANIDÆ.

Perciform fishes with the second suborbital produced into a subocular lamina (subocular shelf), usually with teeth on the palate, separate lower pharyngeal bones, gill-membranes free from isthmus, 6 or 7 branchiostegal rays, and two nostrils on each side. Spinous dorsal well developed; soft portion of dorsal usually not much more developed than anal; latter usually with 3 spines. Ribs usually sessile on the anterior vertebræ, inserted on the transverse processes when these are well developed.

Mostly marine and represented over the greater part of the world. Five genera have members in African fresh waters.

*Synopsis of the Genera.*

## I. Villiform teeth on the palate; 7 branchiostegal rays.

- Ventrals a little behind vertical of base of pectorals,  
without scaly basal process; dorsal fins con-  
tiguous or narrowly separated from each other;  
tongue with teeth . . . . . 1. *Morone*, Mitch., p. 101.
- Ventrals below or slightly behind base of pectorals,  
with scaly basal process; dorsal fins contiguous  
or narrowly separated; tongue without teeth . . . 2. *Lates*, C. & V., p. 105.
- Ventrals a little behind base of pectorals, with scaly  
basal process; dorsal fins widely separated;  
tongue without teeth . . . . . 3. *Luciolates*, Blgr., p. 110.

## II. Teeth on palate in a single series; 6 branchiostegal rays.

- Ventrals below base of pectorals, with scaly basal  
process; scales large, cycloid; a small spine,  
directed forwards, in front of dorsal fin . . . 4. *Ambassis*, C. & V., p. 111.
- Ventrals a little behind vertical of base of pectorals,  
without scaly basal process; scales small,  
ctenoid; a very strong opercular spine . . . 5. *Therapon*, Cuv., p. 113.

## 1. MORONE.

Mitchell, Rep. Fish. N. York, p. 18 (1814), part.; Gill, Proc. Ac. Philad. 1860,  
p. 115; Bouleng. Cat. Fish. i. p. 125 (1895), and Fish. Nile, p. 447 (1907).  
*Labrax* (non Pall.), Cuv. & Val. Hist. Poiss. ii. p. 55 (1828); Günth. Cat. Fish.  
i. p. 63 (1859).  
*Dicentrarchus*, Gill, t. c. p. 111.

Body more or less elongate, moderately compressed; scales moderate  
or rather large, ctenoid; lateral line complete. Mouth moderate or

rather large, protractile; maxillary exposed, without supplemental bone; villiform teeth in jaws and on vomer and palatines; tongue with patches of teeth. Præoperculum serrated; operculum with two feeble spines. 7 branchiostegal rays. Two dorsals, contiguous or narrowly separated, with 9 to 11 spines; anal short, with 3 spines. Ventrals a little behind vertical of base of pectorals. Vertebrae 25 (12+13).

Coasts and mouths of rivers of the North Atlantic, as far south as the Senegal, and Mediterranean, sometimes ascending rivers; fresh waters of North America (Mississippi and eastwards). Two species occasionally ascend the Lower Nile and the Senegal.

### 1. MORONE LABRAX.

*Perca labrax*, Linn. Syst. Nat. i. p. 482 (1766); Donovan. Brit. Fish. ii. pl. xliii. (1802).

*Perca punctata*, Gmel. Syst. Nat. i. p. 1311 (1789).

*Scienæ labrax*, Bloch, Ausl. Fische, vi. p. 52, pl. ccc. (1792).

*Scienæ diacantha*, Bloch, t. c. p. 58, pl. ccii.

*Perca diacantha*, Bloch, Schneid. Syst. Ichth. i. p. 85 (1801).

*Centropomus lupus*, Lacep. Hist. Poiss. iv. p. 267 (1802).

*Perca elongata*, Geoffr. Descr. Egypte, Poiss. pl. xix. fig. 1 (1809).

*Perca sinuosa*, I. Geoffr. op. cit. p. 316, pl. xx. fig. 3.

*Labrax lupus*, Cuv. & Val. Hist. Poiss. ii. p. 56, pl. ii. (1828); Yarr. Brit. Fish. i. p. 6, fig. (1836); Bonap. Icon. Faun. Ital., Pesci (1836); Kröyer, Danm. Fisk. i. p. 23 (1838); Costa, Faun. Nap., Pesci, pl. v. (1850); Günth. Cat. Fish. i. 63 (1859); Steind. Verh. zool.-bot. Ges. Wien, xii. 1862, p. 496; Couch, Brit. Fish. i. p. 189, pl. xl. (1862); Günth. Ann. & Mag. N. H. (3) xii. 1863, p. 175; Brito Capello, Jorn. Sc. Lisb. i. 1867, p. 154, figs.; Steind. Sitzb. Ak. Wien, lvi. i. 1867, p. 606; Canestr. Faun. Ital., Pesci, p. 78 (1874); Collett, Vid. Selsk. Forh. Christ. 1874, no. 3, p. 15 (1875); Day, Fish. Gr. Brit. p. 8, pl. ii. (1880); Moreau, Poiss. France, ii. p. 333 (1881); Lilljeb. Sver. Norg. Fisk. i. p. 55 (1881); Möbius & Heineke, Fische Ostsee, p. 31 (1883); Doderl. Man. Ittiol. Medit. iv. p. 16 (1889).

*Labrax elongatus*, Cuv. & Val. t. c. p. 77; Günth. t. c. p. 64.

*Labrax vulgaris*, Guérin, Icon. Règne Anim., Poiss. pl. i. fig. 4 (1829).

*Labrax diacanthus*, Gill, Proc. Ac. Philad. 1860, p. 110; Peters, Mon. Berl. Ac. 1865, p. 96.

*Dicentrarchus elongatus*, Gill, t. c. p. 111.

*Labrax linnei*, Malm, Göteb. Bohusl. Faun. p. 379 (1877).

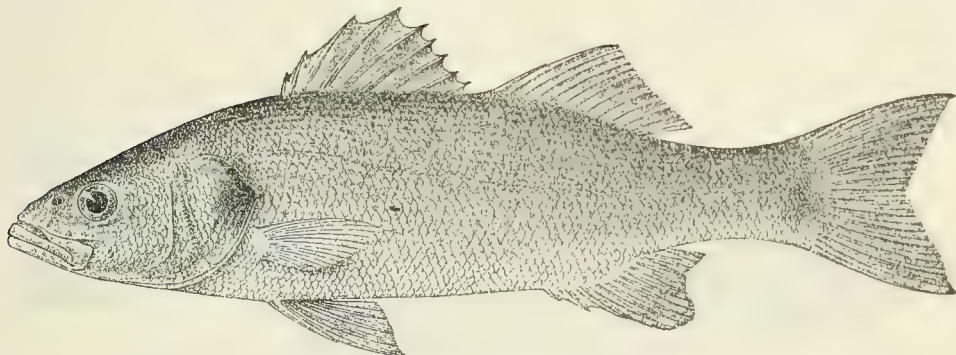
*Dicentrarchus labrax*, Jord. & Eigenm. Bull. U.S. Fish Comm. viii. 1890, p. 425.

*Roccus labrax*, Smitt, Scand. Fish. i. p. 45, fig. (1893).

*Morone labrax*, Bouleng. Cat. Fish. i. p. 130 (1895), and Fish. Nile, p. 447, fig. (1907).

Depth of body  $3\frac{2}{3}$  to  $4\frac{1}{2}$  times in total length, length of head 3 to  $3\frac{3}{4}$  times. Snout  $1\frac{1}{2}$  to 2 times diameter of eye, which is 5 to 7 times in length of head in adult; interorbital space wide, covered with cycloid scales; lower jaw slightly projecting; maxillary extending to below anterior third or centre of eye; vomerine teeth forming a crescentic group; 4 to 6 strong antrorse spines on lower border of præoperculum; lower opercular spine stronger than upper. Gill-rakers longer than gill-laminæ, 16–18 on lower part of anterior arch. Dorsal VIII–IX, I–II 12–13; fourth and fifth spines longest,  $\frac{2}{5}$  to  $\frac{3}{5}$  length of head.

Fig. 80.

*Morone labrax.*L. Menzaleh (F. N.).  $\frac{2}{5}$ .

Anal III 11–12; third spine longest,  $\frac{1}{4}$  to  $\frac{1}{3}$  length of head. Pectoral  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Caudal emarginate, middle rays about  $\frac{2}{3}$  length of outer. Scales 65–80  $\frac{10-12}{16-21}$ . Silvery, back grey or olive, without spots in the adult, sometimes black-spotted in the young and half-grown; a blackish spot at the end of the gill-cover.

Attains a length of 800 millim.

Mediterranean and coasts of Europe, as far north as Finmark.

1–2. Ad.	L. Menzaleh.	L. Loat, Esq. (C.).
3. Ad.	Barrage N. of Cairo.	Capt. S. S. Flower (C.).

## 2. MORONE PUNCTATA.

*Sciaena punctata*, Bloch, *Ausl. Fische*, vi. p. 64, pl. cccv. (1792).

*Perca punctulata*, Lacep. *Hist. Poiss.* iv. p. 418 (1802).

*Perca punctata*, I. Geoffr. *Descr. Egypte*, Poiss. p. 316, pl. xx. fig. 2 (1827).

*Labrax punctatus*, Günth. *Ann. & Mag. N. H.* (3) xii. 1863, p. 175; Brito Capello, *Jorn. Sc. Lisb.* i. 1867, p. 154, figs.; Steind. *Sitzb. Ak. Wien*, lvi. i. 1867, p. 607, and lx. i. 1869, p. 671; Moreau, *Poiss. France*, ii. p. 337, fig. (1881);



Doderl. Man. Ittiol. Medit. iv. p. 23 (1889); Bellotti, Atti Soc. Ital. Sc. Nat. xxxiii. 1891, p. 121.

*Labrax orientalis*, Günth. l. c.

*Labrax schoenleinii*, Peters, Mon. Berl. Ac. 1865, p. 95, and 1866, p. 512.

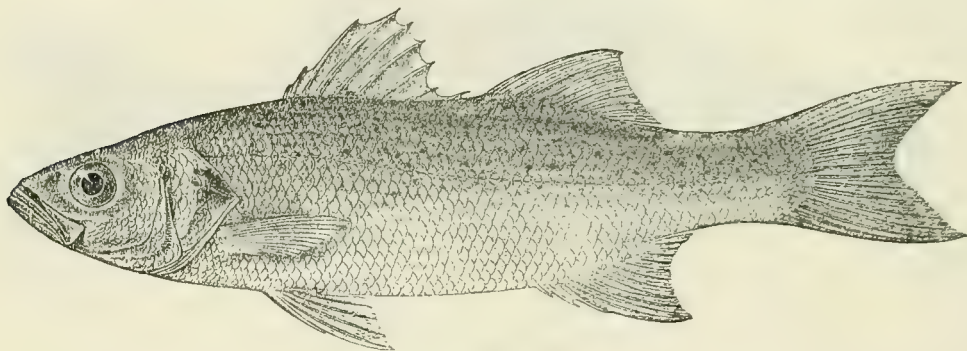
*Dicentrarchus orientalis*, Jord. & Eigenm. Bull. U.S. Fish. Comm. viii. 1890, p. 425.

*Dicentrarchus punctatus*, Jord. & Eigenm. t. c. p. 426.

*Morone punctata*, Bouleng. Cat. Fish. i. p. 131 (1895), and Fish. Nile, p. 449, fig. (1907).

Very closely allied to the preceding, but easily distinguished by the more triangular shape of the group of vomerine teeth, which is often

Fig. 81.



*Morone punctata*.

L. Menzaleh (F. N.).  $\frac{2}{5}$ .

trilobed behind; the larger eye, which is but slightly shorter than the snout and  $\frac{1}{4}$  to  $\frac{2}{9}$  length of head and nearly equals interorbital width in the adult; the presence of ctenoid scales on the top of the head; and the larger scales on the body, which are in 58 to 65 longitudinal and  $\frac{8-10}{14-17}$  transverse series. Upper half of the body constantly spotted with black.

Total length 360 millim.

Mediterranean and coasts of Atlantic from Normandy to Senegambia.

1-2. Types of <i>L. orientalis</i> .	Alexandria.	J. Petherick, Esq. (C.).
3. Hgr.	Near Gemil, L. Menzaleh.	L. Loat, Esq. (C.).
4-5. Ad.	L. Menzaleh.	"
6-10. Hgr. & yg.	L. Borollos.	"
11. Yg.	L. Mareotis.	"
12-13. Hgr.	St. Louis, Senegal.	M. P. Delhez (C.).

## 2. LATES.

Cuv. & Val. Hist. Poiss. ii. p. 88 (1828); Günth. Cat. Fish. i. p. 67 (1859); Bouleng. Cat. Fish. i. p. 361 (1895), Poiss. Bass. Congo, p. 380 (1901), and Fish. Nile, p. 452 (1907).

Body elongate, moderately compressed, covered with moderate or small ctenoid scales; lateral line complete, extending on the base or nearly to the extremity of the caudal fin. Mouth large, protractile; maxillary exposed, with supplemental bone; villiform teeth in jaws and on vomer, palatines, and ectopterygoids. Præorbital, præoperculum, and exposed parts of post-temporal and clavicle serrated; operculum ending in a spine. 7 branchiostegal rays. Two dorsals, contiguous or narrowly separated, with 8 or 9 spines; anal short, with three spines; both fins with a scaly sheath at the base. Ventrals below or slightly behind base of pectorals, with a scaly basal process. Vertebrae 25 (12+13).

Fresh waters of Africa (Nile, Senegal, Niger, and Congo Systems); mouths of rivers and coasts of South-Eastern Asia and North Australia.

*Synopsis of the Species.*

- Sc. 60-80  $\frac{8-12}{22-24}$ ; interorbital space at least equal to diameter of eye in adult; caudal rounded; caudal peduncle as long as deep or a little longer than deep . . . . . 1. *L. niloticus*, L., p. 105.
- Sc. 100-130  $\frac{12-15}{29-36}$ ; interorbital space at least equal to diameter of eye in adult; caudal truncate or slightly emarginate; caudal peduncle much longer than deep . . . . 2. *L. microlepis*, Blgr., p. 108.
- Sc. 125-150  $\frac{14-18}{38-45}$ ; interorbital space about  $\frac{1}{2}$  diameter of eye; caudal rounded; caudal peduncle much longer than deep . . . . 3. *L. angustifrons*, Blgr., p. 109.

## 1. LATES NILOTICUS.

*Perca nilotica*, Linn. in Hasselq. Reise Palæst. p. 404 (1762), and Syst. Nat. i. p. 483 (1766); Sonnini, Voy. Egypte, ii. p. 292, pl. xxii. fig. 3 (1799).

*Centropomus niloticus*, Lacep. Hist. Poiss. iv. p. 277 (1802).

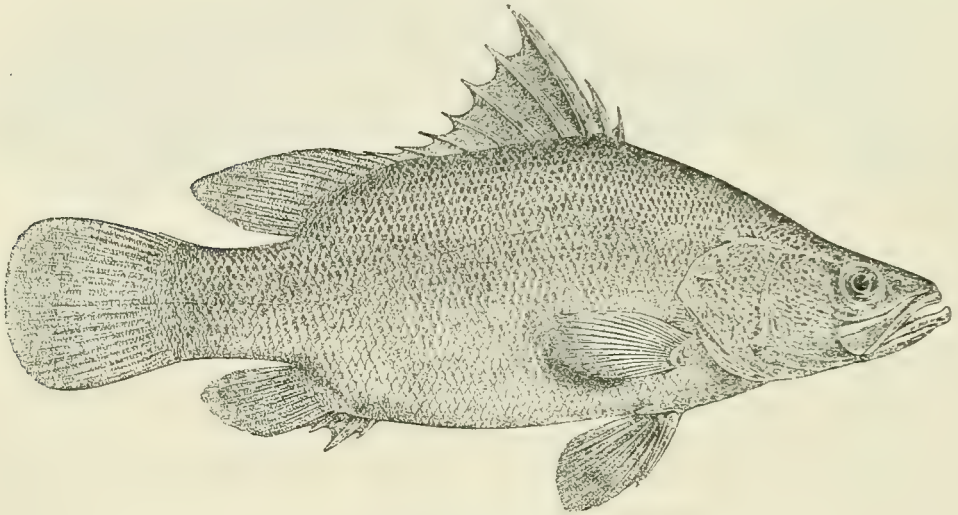
*Perca latus*, I. Geoffr. Descr. Egypt, Poiss. p. 280, pl. ix. fig. 1 (1827).

*Lates niloticus*, Cuv. & Val. Hist. Poiss. ii. p. 89 (1828), and iii. p. 490 (1829); Günth. Cat. Fish. i. p. 67 (1859), and Petherick's Trav. ii. p. 207 (1869); Steind. Sitzb. Akad. Wien, lx. i. 1869, p. 672, pl. i.; Bouleng. Cat. Fish. i.

p. 362 (1895); Pfeff. Thierw. O.-Afr., Fische, p. 2, fig. (1896); Bouleng. Poiss. Bass. Congo, p. 381 (1901); Lortet & Gaillard, Arch. Mus. Lyon, viii. 1903, p. 188, figs.; Bouleng. Fish. Nile, p. 452, pls. lxxxiv. & lxxxv. (1907).

Depth of body  $2\frac{1}{2}$  to 4 times in total length, length of head  $2\frac{3}{4}$  to  $3\frac{1}{2}$  times; shape very variable, the upper outline of the head usually more or less concave. Snout rounded, as long as or a little longer than eye (much longer in very large specimens); lower jaw projecting; eye 4 (young) to 7 times in length of head,  $\frac{4}{5}$  to  $1\frac{1}{2}$  times in interorbital width; maxillary extending to below posterior border of eye or beyond, the width of its distal extremity at least three-fourths diameter of eye; præ- and suborbitals finely serrated; cheek, gill-cover, and occiput with large scales; præopercular border forming nearly a right angle, finely serrated

Fig. 82.



*Lates niloticus*.

Khartum (F. N.).  $\frac{2}{5}$ .

on vertical limb, with 3 or 4 strong spines on lower limb, and with one or two still stronger spines at angle; a single opercular spine; clavicle with some strong denticulations above the base of the pectoral fin. Gill-rakers rather long, 15 to 17 (including knob-like rudiments) on lower part of anterior arch. Dorsals VII-VIII, I-II 10-14, connected at the base; spines strong, first and second short, third very strong, longest  $\frac{1}{3}$  (adult) to  $\frac{2}{5}$  (young) length of head, usually as long as or longer than longest soft rays. Anal III 7-9; spines short, second and third equal or third longest. Pectoral nearly  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Caudal rounded. All the soft rays of the vertical fins more or less densely

scaled, at least at base. Caudal peduncle as long as deep or a little longer than deep. Scales 60–80  $\frac{8-12}{22-24}$ . Uniform brown or olive above in the adult, silvery beneath, sometimes tinged with yellow, young usually (occasionally up to a length of 250 millimetres) marbled with brown, sometimes uniform; very young specimens (under 70 millimetres) with more or less irregular dark brown cross-bands, the first of which extends on the deepest part of the dorsal fin; fins whitish, dark at the base in the young.

Reaches a length of 1800 millim.

Nile, Senegal, Niger, Lakes Chad, Rudolf, and Abbaya, Congo.

1–2. Yg.	L. Menzaleh.	Dr. J. C. Mitchell (P.).
3–4. Hgr.	Near Ghet-el-Nassara, L. Menzaleh.	L. Loat, Esq. (C.).
5. Yg.	Lower Nile.	J. Petherick, Esq. (C.).
6–14. Yg.	Samannud.	L. Loat, Esq. (C.).
15–16. Ad. & hgr.	Barrage N. of Cairo.	„
17–26. Hgr. & Yg.	Beni Souef.	„
27–31. Ad. & yg.	Birket Karun.	„
32. Skel.	„	Dr. J. Anderson (P.).
33–34, 35–38. Hgr. & yg.	Near Luxor.	L. Loat, Esq. (C.).
39. Yg.	Between Luxor and Assuan.	„
40–41. Yg.	Kosheh, Nubia.	„
42–43. Hgr.	Khartum.	J. Petherick, Esq. (C.).
44. Yg.	Rosaires, Blue Nile.	Capt. S. S. Flower (P.).
45. Yg.	Fashoda.	L. Loat, Esq. (C.).
46. Hgr.	Polkom, Baro R. (Sobat).	Mr. P. C. Zaphiro (C.); W. N. McMillan, Esq. (P.).
47–48. Yg.	Mouth of L. No.	L. Loat, Esq. (C.).
49–58. Yg.	L. No.	„
59. Ad.	Butyaba, L. Albert.	J. S. Budgett, Esq. (P.).
60. Hgr.	R. Shari-wasu, at Maidugari.	Capt. G. B. Gosling (P.).
61. Yg.	R. Yo, L. Chad.	„
62. Hgr.	Kano, Hadeya R., L. Chad.	„
63. Yg.	Komadugu R., „	Paris Museum (E.).
64. Hgr.	St. Louis, Senegal.	M. P. Delhez (C.).
65–69. Yg.	Kaëdi, „	„
70. Ad.	Geba R. at Bafata, Portug. Guinea.	Dr. W. J. Ansorge (C.).
71. Yg.	Culufi R. at Bafata, Portug. Guinea.	„
72–73. Ad.	Niger.	Mr. J. T. Dalton (C.).
74. Ad.	„	W. A. Forbes, Esq. (P.).
75. Skel.	„	„



76. Hgr.	Erpkon, Upper Niger.	J. S. Budgett, Esq. (P.).
77-79. Yg.	Agberi, Lower „	Dr. W. J. Ansorge (C.).
80. Yg.	R. Benue, N. of Ibi.	H. L. Norton Traill, Esq. (C.).
81. Yg.	Boma, Lower Congo.	Capt. Wilverth (C.).
82. Ad.	Dolo, Stanley Pool.	M. P. Delhez (C.).
83. Ad.	Monsembe, Upper Congo.	Rev. J. H. Weeks (P.).
84. Yg.	Banzyville, Ubanghi.	Capt. Royaux (C.).

## 2. LATES MICROLEPIS.

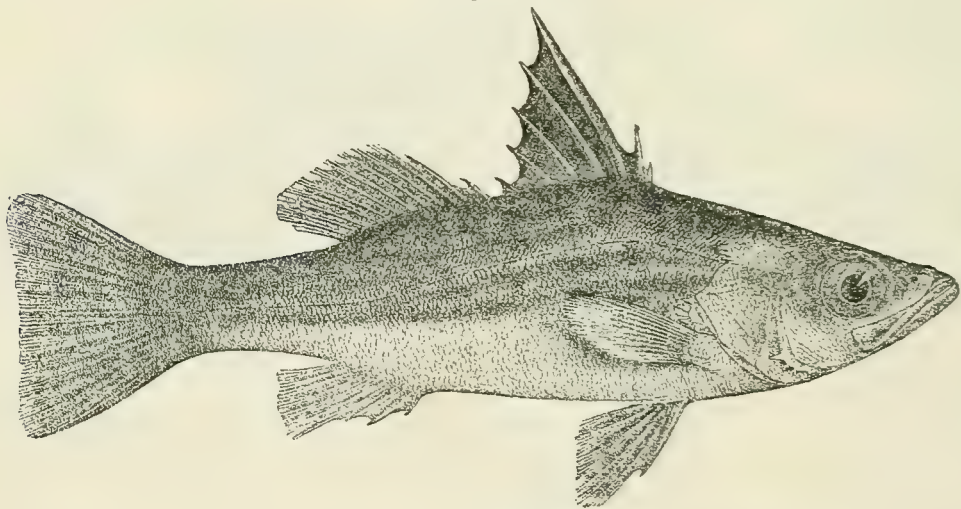
Bouleng. Tr. Zool. Soc. xv. 1898, p. 6, pl. i. fig. 1, and 1899, p. 87, Poiss. Bass.

Congo, p. 382 (1901), and Tr. Zool. Soc. xvii. 1906, p. 555.

*Lates mariae*, Steind. Anz. Ak. Wien, 1909, p. 399.

Depth of body  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times in total length, length of head  $2\frac{2}{3}$  (young) to  $3\frac{1}{2}$  times. Upper profile of head nearly straight or slightly concave snout as long as eye in young, up to  $2\frac{1}{2}$  times in adult; eye  $3\frac{1}{3}$  (young) to

Fig. 83.



*Lates microlepis*.

Type (Tr. Z. S. 1898).  $\frac{5}{8}$ .

9 times in length of head; interorbital width  $\frac{3}{5}$  diameter of eye in very young, greater than eye in adult; maxillary extending to below centre or posterior border of eye, the width of its distal extremity  $\frac{2}{5}$  to  $\frac{2}{3}$  diameter of eye; præorbital finely serrated; cheeks, opercles, and occiput covered with small scales; præopercular border forming nearly a right angle, sometimes a little produced at the angle, finely toothed on its vertical

limb, with 2 or 3 widely separated spines on its lower border, and with one or two very strong spines at the angle; a strong opercular spine; 2 to 5 strong spines on the clavicle. 13 to 16 gill-rakers on lower part of anterior arch. Dorsals VII, I-II 11-12, contiguous or completely separated; first spine very short or minute, third very strong, longest,  $\frac{1}{2}$  (adult) to  $\frac{3}{4}$  (young) length of head; longest soft rays  $\frac{1}{3}$  to  $\frac{1}{2}$  length of head. Anal III 8-9; spines short, second and third equal. Pectoral  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Caudal truncate or slightly emarginate. Caudal peduncle  $1\frac{2}{3}$  to 2 times as long as deep. Scales 100-130  $\frac{12-15}{29-36}$ . Silvery, back olive-grey, spinous dorsal brown; young spotted or marbled with dark brown.

Reaches a length of 1340 millim.

Lake Tanganyika.

1-2. Types.	Kinyamkolo.	Prof. J. E. S. Moore (C.).
3-5. Ad. & hgr.	Niamkolo.	Dr. W. A. Cunnington (C.).
6-7. Yg.	Kituta.	"
8. Hgr.	Kilewa Bay.	Dr. L. Stappers (C.).
9-10. Hgr.	Mouth of Little Rusisi R.	"
11-13. Ad. & hgr.	Middle of lake, in deep water.	Prof. J. E. S. Moore (C.).
14. Yg.	L. Tanganyika.	"
15. Skel.	Albertville.	Capt. Hecq (C.).

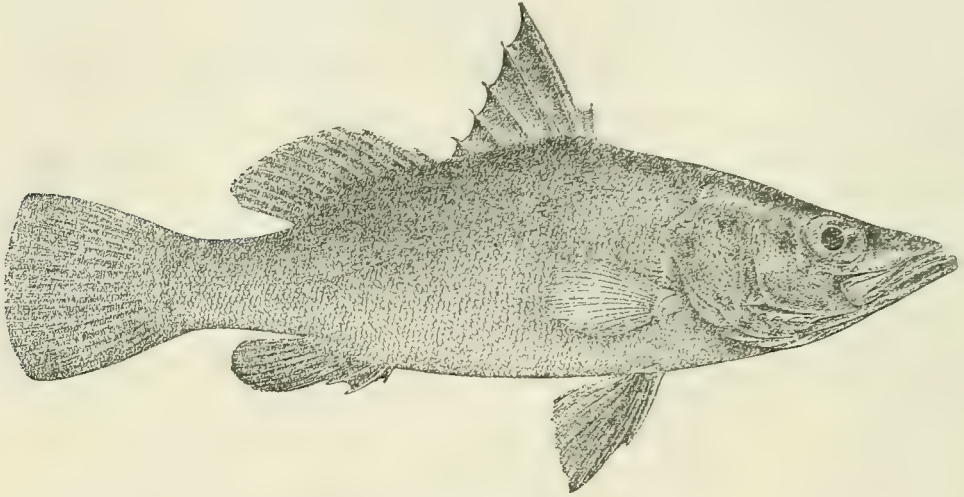
### 3. LATES ANGUSTIFRONS.

Bouleng. Tr. Zool. Soc. xvii. 1906, p. 555, pl. xxxv. fig. 1.

Depth of body  $3\frac{1}{3}$  times in total length, length of head 3 times. Upper profile of head nearly straight; snout a little longer than eye, which is 4 to  $4\frac{1}{2}$  times in length of head and nearly double interorbital width; lower jaw projecting; maxillary extending to below anterior third or centre of eye, the width of its distal extremity  $\frac{2}{5}$  to  $\frac{1}{2}$  diameter of eye; præ- and suborbitals finely serrated; cheeks, opercles, and occiput covered with small scales; præopercular border forming nearly a right angle, finely toothed on its vertical limb, with 3 widely separated spines on its lower limb, and with a very strong spine at the angle; a strong opercular spine; 4 or 5 strong spines on the clavicle. 14 gill-rakers on lower part of anterior arch. Dorsals VII, I 11-12, connected at the base; first spine minute, third very strong, longest, about  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head; longest soft rays  $\frac{1}{3}$  to nearly  $\frac{1}{2}$  length of head. Anal III 8; spines short, second and third equal. Pectoral  $\frac{1}{2}$  or not quite  $\frac{1}{2}$

length of head. Caudal rounded. Caudal peduncle  $1\frac{2}{3}$  to 2 times as long as deep. Scales 125–150  $\frac{14-18}{38-45}$ . Yellowish, darkish grey above, shading to white below; middle region of body faintly mottled with grey; ventral fins yellowish.

Fig. 84.

*Lates angustifrons.*Type (Tr. Z. S. 1906).  $\frac{1}{2}$ .

Total length 265 millim.

Lake Tanganyika.

1. Type.	Niamkolo.	Dr. W. A. Cunningham (C.).
2. Hgr.	Kinyamkolo.	Prof. J. E. S. Moore (C.).

### 3. LUCIOLATES.

Bouleng. Rev. Zool. Afr. iii. 1914, p. 442.

Closely allied to *Lates*, but body more elongate, dorsal fins widely separated from each other, and ventral fins behind vertical of base of pectoral.

Lake Tanganyika.

#### 1. LUCIOLATES STAPPERSII.

Bouleng. l. c.

Depth of body  $4\frac{2}{3}$  to 5 times in total length, length of head  $3\frac{1}{5}$  to  $3\frac{1}{4}$  times. Head strongly compressed,  $3\frac{1}{2}$  times as long as broad; snout pointed, twice as long as eye, which is 5 to  $5\frac{1}{2}$  times in length of head and equals interorbital width; lower jaw projecting; maxillary not extending to below anterior border of eye; serrature of præorbital very

fine, scarcely distinct; præoperculum with the posterior border finely toothed, the lower border with 2 or 3 small spines and the angle with two stronger spines; a rather small opercular spine. Gill-rakers long and slender, 22–24 on lower part of anterior arch. Dorsals VI, I–II 9–10, the distance between them greater than the length of either; first and sixth spines minute, easily overlooked, second longest, nearly  $\frac{1}{2}$  length of head; longest soft rays not quite  $\frac{1}{3}$  length of head. Anal III 9, spines very feeble. Pectoral very asymmetrical, upper rays longest,  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head. Caudal with deep, crescentic notch. Caudal peduncle 3 to  $3\frac{1}{2}$  times as long as deep. Scales 93–100  $\frac{6}{20-21}$ . Brown, with a white ventral band; base of pectoral fin black.

Total length 380 millim.

Lake Tanganyika.—Types in Congo Museum, Tervueren.

1. One of the types. Kilewa Bay. Dr. L. Stappers (C.).

## 2. LUCIOLATES BREVIOR.

Bouleng. t. c. p. 443.

Agrees very closely with the preceding, but body less elongate; distance between dorsal fins not exceeding the length of either, and eye larger. Depth of body 4 times in total length, length of head 3 times. Head 3 times as long as broad; eye  $1\frac{1}{2}$  times in length of snout, 4 times in length of head, and nearly twice interorbital width. 24 gill-rakers. Dorsals VI, II 9. Anal III 8. Caudal peduncle not quite 3 times as long as deep. Scales 90  $\frac{6}{21}$ .

Total length 310 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

## 4. AMBASSIS.

Cuv. & Val. Hist. Poiss. ii. p. 175 (1828); Günth. Cat. Fish. i. p. 222 (1859).

Body oblong or short, strongly compressed; scales large, cycloid; lateral line complete. Mouth moderately large, protractile; maxillary exposed, without supplemental bone; teeth in jaws villiform; small teeth on vomer and palatines. Præorbital and præoperculum serrated, operculum without a prominent spine. 6 branchiostegal rays. Dorsal divided into two portions by a deep notch, with 8 spines, preceded by a small spine directed forwards; anal similar in size to the soft part of the dorsal, with 3 spines; both fins with a scaly sheath at the base.



Ventrals below base of pectorals, with a scaly basal process. Vertebrae 24 (10+14).

Indian and Pacific Oceans; a few species in fresh waters. One species is to be included in the African fresh-water fauna\*.

#### 1. AMBASSIS COMMERSONII.

*Centropomus ambassis*, Lacep. Hist. Poiss. iv. p. 273 (1802).

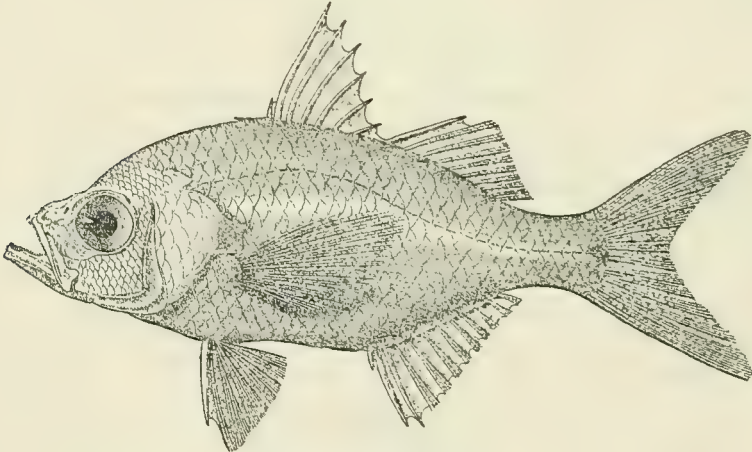
*Ambassis commersonii*, Cuv. & Val. Hist. Poiss. ii. p. 176, pl. xxv. (1828); Bleek. Verh. Batav. Gen. xxii. 1849, p. 30; Günth. Cat. Fish. i. p. 223 (1859); Peters, Reise Mossamb. iv. p. 10 (1868); Day, Fish. Ind. p. 52, pl. xv. fig. 3 (1875); Bleek. Atl. Ichthyol. viii. p. 136, pl. lxxiv. fig. 5 (1877); Pfeff. Thierw. O.-Afr., Fische, p. 4, fig. (1896).

*Ambassis macracanthus*, Bleek. Verh. Batav. Gen. xxii. 1849, p. 30; Günth. t. c. p. 227.

*Ambassis productus*, Guichen. Mém. Soc. Sci. Cherbourg, xii. 1866, p. 130.

Depth of body  $2\frac{1}{2}$  to  $2\frac{3}{4}$  times in total length, length of head 3 times. Snout convex, as long as or shorter than eye, which is  $2\frac{1}{2}$  (young) to  $3\frac{1}{3}$

Fig. 85.



*Ambassis commersonii*.

Type, after Cuvier and Valenciennes.

times in length of head; interorbital width  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times in length of head; lower jaw projecting; maxillary extending to below anterior

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\* The statement, in Playfair and Günther's 'Fishes of Zanzibar,' p. 18, that *Ambassis urotenia*, Blkr., occurs in fresh water in the Seychelles is probably a mistake, and is not repeated in Playfair's later list of the Fishes of the Seychelles (Proc. Zool. Soc. 1867). The same remark applies also to *Apogon hyalosoma*, Blkr.

fourth of eye; præorbital strongly serrated; præoperculum with two strongly serrated edges; no opercular spine; two series of scales on the cheek. Gill-rakers long and slender, 17–19 on lower part of anterior arch. Dorsal VII, I 10; second spine longest and strongest,  $\frac{2}{3}$  to once length of head, eighth about as long as fourth,  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Anal III 10; third spine longest, as long as eighth dorsal. Pectoral  $\frac{3}{4}$  to  $\frac{5}{6}$  length of head. Caudal deeply emarginate. Scales 28–29  $\frac{3}{9}$ . Back greenish brown; a silvery lateral band; membrane between the second and third dorsal spines blackish or closely speckled with black, at least near the edge.

Total length 130 millim.

East Coast of Africa to the Malay Archipelago and the North Coast of Australia; often found in fresh water.—Types in Paris Museum.

1–4. Ad. & yg.	Zanzibar.	Sir. L. Playfair (P.).
5–7. Hgr. & yg.	Rovuma R.	Dr. Livingstone (P.).
8–10. Hgr.	„ 80 miles from coast.	Sir J. Kirk (C.).
11–12. Yg.	Dar-es-Salaam, German E. Africa.	Mr. J. Paul Arnold (P.).
13. Ad.	Orilaky R., at Tongabory, Madagascar.	Paris Museum (E.).

## 5. THERAPON.

Cuv. Règne Anim. ii. p. 295 (1817); Cuv. & Val. Hist. Poiss. iii. p. 125 (1829); Günth. Cat. Fish. i. p. 274 (1859), part.

Body oblong, strongly compressed; scales small, ciliated; lateral line complete. Mouth moderately large, feebly protractile; maxillary exposed, without supplemental bone; teeth in jaws villiform, with an outer series strongly enlarged and conical; a single series of small teeth on vomer and palatines. Præorbital, præoperculum, and exposed parts of post-temporal and clavicle serrated; operculum with a strong spine. 6 branchiostegal rays. Dorsal divided into two portions by a deep notch, with 11 or 12 spines; anal short, with 3 spines; both fins with a scaly sheath at the base. Ventrals behind the vertical of the base of the pectorals. Vertebrae 25 (10+15). Air-bladder divided into a shorter anterior and a longer posterior portion by a constriction.

Indian and Pacific Oceans, some species entering rivers.

### 1. THERAPON JARBUA.

*Sciæna jarbua*, Forsk. Descr. Anim. p. 50 (1775).

*Holocentrus servus*, Bloch, Ausl. Fische, iv. p. 80, pl. ccxxxviii. fig. 1 (1790).

*Holocentrus jarbua*, Lacép. Hist. Poiss. iv. pp. 348, 355 (1802).

*Grammistes servus*, Bloch, Schneid. Syst. Ichthyol. i. p. 185 (1801).

*Coius trivittatus*, Ham. Buch. Fish. Ganges, p. 92 (1822).

*Therapon timoriensis*, Quoy & Gaim. Voy. Uran. & Physic., Zool. p. 341 (1824).

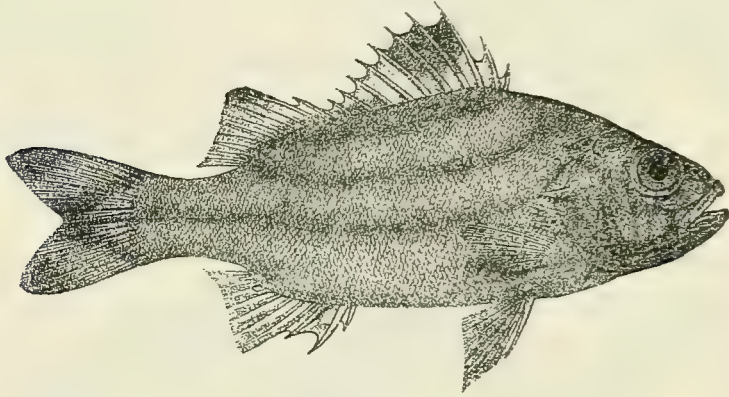
*Therapon servus*, Cuv. & Val. Hist. Poiss. iii. p. 125 (1829), and vii. p. 479 (1831); Rüpp. N. Wirbelth. Abyss., Fische, p. 95 (1840); Günth. Cat. Fish. i. p. 278 (1859); Peters, Reise Mossamb. iv. p. 10 (1868); Bleek. Atl. Ichthyol. vii. p. 112, pl. xxxiv. fig. 2 (1875); Günth. Fische Südsee, p. 26 (1873).

*Therapon trivittatus*, Cantor, Cat. Mal. Fish. p. 19 (1850).

*Therapon jarbua*, Klunz. Verh. zool.-bot. Ges. Wien, xx. 1870, p. 729; Day, Fish. Ind. p. 69, pl. xviii. fig. 4 (1875); Klunz. Fische Roth. Meer. p. 26 (1884); Jord. & Seale, Bull. Bur. Fishes, xxv. 1906, p. 266.

Depth of body  $2\frac{3}{5}$  to  $3\frac{1}{4}$  times in total length, length of head 3 to  $3\frac{1}{2}$  times. Snout convex, as long as eye in adult, a little shorter in young;

Fig. 86.



*Therapon jarbua*.

India. After Day (*op. cit.*).  $\frac{1}{2}$ .

eye 3 (young) to  $3\frac{3}{4}$  times in length of head, interorbital width 3 to  $3\frac{1}{3}$  times; maxillary extending to below anterior third or centre of eye; a broad band of villiform teeth, with an outer series of rather large teeth; cheek and opercle covered with small scales; whole border of præoperculum serrated, the serræ strongly enlarged at the angle; a very strong and long opercular spine. Gill-rakers 10–13 on lower part of anterior arch. Dorsal XI–XII 10–11, originating behind vertical of axilla; first spine very short, third, fourth, or fifth longest,  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head, last much longer than penultimate; anterior soft rays longest, shorter than longest spines. Anal III 7–8; second and third spines equal, or third a little longer, as long as or a little longer than last dorsal. Pectoral  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head. Caudal rather deeply notched, median

rays more than  $\frac{1}{2}$  as long as longest. Scales 80–90  $\frac{13-14}{30-33}$ . Silvery, back olive; three olive-brown or blackish streaks on each side, the upper below the spinous dorsal, the second from the nape to the caudal peduncle, the third from the occiput to the caudal; fins white or pale yellow; a large black blotch on the spinous dorsal, a smaller one at the tip of the soft dorsal; caudal with five blackish bands, one along the middle rays and two pairs converging posteriorly.

Total length 250 millim.

From the Red Sea and the East Coast of Africa to China and the North Coast of Australia, the Solomon Islands, Samoa, and Fiji; entering rivers.

1. Ad.	Red Sea.	Marquis G. Doria (P.).
2–4. Hgr.	Abd-el-Kuri.	W. R. Ogilvie-Grant, Esq., & Dr. H. O. Forbes (P.).
5. Ad.	Mombasa.	R. J. Cuningham, Esq. (P.)
6–7. Yg.	Rovuma R.	Dr. Livingstone (P.).
8. Ad.	Zanzibar.	Sir L. Playfair.
9. Ad., skin.	”	”
10. Hgr.	Mouth of Zambesi.	Sir J. Kirk.
11–12. Ad.	Durban.	— Sergeant, Esq. (P.).

#### Fam. 4. SCIÆNIDÆ.

Differing from the Serranidæ in the anal fin being very much shorter than the soft dorsal and with one or two spines only; palate toothless.

Mostly marine and represented over the greater part of the world. Two genera in African fresh waters:—

No canine teeth . . . . .	1. <i>Corvina</i> , Cuv., p. 115.
Canine teeth . . . . .	2. <i>Otolithus</i> , Cuv., p. 117.

#### 1. CORVINA.

Cuv. Règne Anim. 2nd. ed. ii. p. 173 (1829); Cuv. & Val. Hist. Poiss. v. p. 86 (1830); Günth. Cat. Fish. ii. p. 296 (1860).

Body elongate, compressed; scales moderate or rather small, ctenoid; lateral line complete, extending to the extremity of the caudal fin. Mouth large, protractile, more or less oblique; maxillary exposed, partly or nearly entirely concealed when the mouth is closed; teeth in villiform



bands, some or all of the outer more or less enlarged but not canine-like. Præoperculum serrated; no opercular spines. 7 branchiostegal rays. Two dorsals, connected at the base, the first not more than half as long as the second and with 9 or 10 spines; anal short, with 2 spines. Ventrals below base of pectorals, with basal scaly process. Vertebrae 24-25 (10+14-15)\*.

Mediterranean, Atlantic, Indian, and Pacific Oceans, several species entering rivers.

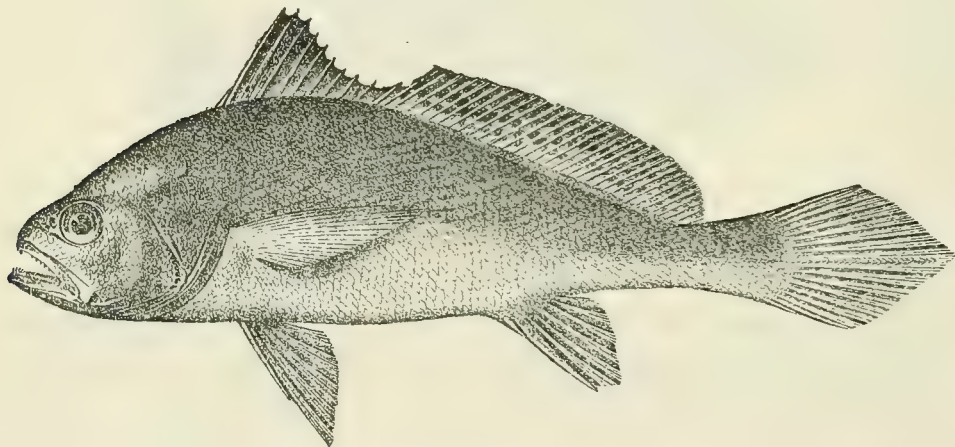
### 1. CORVINA NIGRITA.

Cuv. & Val. Hist. Poiss. v. p. 103 (1830); Günth. Cat. Fish. ii. p. 297 (1860), and Ann. & Mag. N. H. (3) xvi. 1865, p. 49; Steind. Sitzb. Ak. Wien, lx. i. 1869, p. 692, pl. viii.; Pellegr. Bull. Soc. Philom. (9) ix. 1907, p. 35.

*Corvina clavigera*, Cuv. & Val. t. c. p. 101.

Depth of body  $3\frac{1}{3}$  to  $3\frac{2}{3}$  times in total length, length of head  $3\frac{1}{2}$  to 4 times. Snout and nape with convex profile; snout projecting a little

Fig. 87.



*Corvina nigrita*.

Senegal, after Steindachner (*l. c.*).  $\frac{1}{3}$ .

beyond lower jaw, as long as eye (shorter in young); eye 3 (young) to  $4\frac{1}{2}$  times in length of head, nearly equal to interorbital width; maxillary extending to below posterior third or posterior border of eye; head covered with scales, except on the lips. Gill-rakers as long as or a little

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\* On the bony swellings sometimes present at the base of the dorsal and anal spines, cf. Günther, Ann. & Mag. N. H. (3) xvi. 1865, p. 48.

longer than gill-laminæ, 14 to 16 on lower part of anterior arch. Dorsal X 32-37; first spine very short, second and third equal or latter the longer,  $\frac{1}{2}$ , or a little more than  $\frac{1}{2}$ , length of head; longest soft rays about  $\frac{1}{2}$  length of head. Anal II 5-7, below middle of soft dorsal; second spine very strong,  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Pectoral as long as head or a little shorter. Caudal lanceolate. 50-60 scales in longitudinal series. Silvery, greenish on the back; dark streaks, often very indistinct, along the oblique series of scales on the back and sides; spinous dorsal with a large dark blotch, soft dorsal often with round dark spots.

Total length 425 millim.

West Coast of Africa, from the Senegal to the Congo, entering rivers.—Type in Paris Museum.

1-5. Ad., hgr., & yg.	St. Louis, Senegal.	M. P. Delhez (C.).
6. Skel.	" "	"
7-8. Ad.	Gambia.	J. S. Budgett, Esq. (P.).
9. Hgr.	Old Calabar.	Miss Kingsley (C.).
10. Hgr.	Chiloango R., at Sassa Zan.	Dr. W. J. Ansorge (C.).
11. Hgr.	Luani R., at Lundo, Portuguese Congo.	"

## 2. OTOLITHUS.

Cuv. Règne Anim. 2nd ed. ii. p. 172 (1829); Cuv. & Val. Hist. Poiss. v. p. 59 (1830); Günth. Cat. Fish. ii. p. 305 (1860); Bouleng. Poiss. Bass. Congo, p. 384 (1901).

*Pseudotolithus*, Bleek. Nat. Verh. Ges. Haarlem, xviii. 1863, no. 2, p. 59.

Body elongate, compressed; scales moderate or rather small, ctenoid; lateral line complete, extending to the extremity of the caudal fin. Mouth large, protractile, oblique; maxillary nearly entirely concealed when the mouth is closed; teeth cardiform, intermixed with larger, canine-like teeth. Præoperculum serrated; no opercular spines. 7 branchiostegal rays. Two dorsals, connected at the base, the first not more than half as long as the second and with 9 or 10 spines; anal short, with 2 spines. Ventrals below base of pectorals, with basal scaly process. Vertebrae 24-25 (10-11+14). Air-bladder with processes or appendages.

Tropical and Subtropical seas, some species entering rivers.

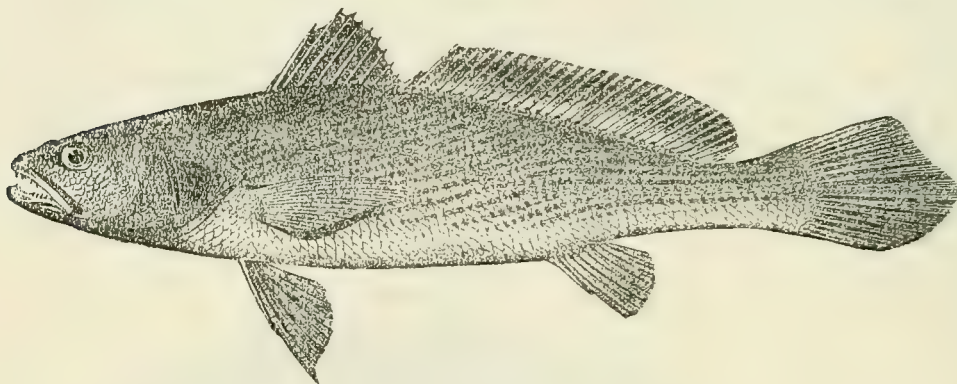
## 1. OTOLITHUS SENEGALENSIS.

Cuv. & Val. Hist. Poiss. ix. p. 476 (1833) ; Steind. Sitzb. Ak. Wien, lx. i. 1869, p. 687, pl. vi., and Notes Leyd. Mus. xvi. 1894, p. 17 ; Bouleng. Poiss. Bass. Congo, p. 385 (1901).

*Pseudotolithus typus*, Bleek. Nat. Verh. Ges. Haarlem, xviii. 1863, no. 2, p. 59, pl. xv. fig. 1.

Depth of body  $4\frac{1}{4}$  to  $4\frac{1}{2}$  times in total length, length of head  $3\frac{2}{3}$  to  $3\frac{3}{4}$  times ; upper profile between snout and dorsal fin nearly straight. Lower jaw projecting a little beyond upper ; snout a little longer than eye, which is  $5\frac{2}{3}$  to  $6\frac{1}{2}$  times in length of head and nearly equals interocular width ; maxillary extending to or a little beyond vertical of posterior

Fig. 88.

*Otolithus senegalensis*.

Senegal, after Steindachner (*l. c.*).  $\frac{1}{3}$ .

border of eye ; head covered with scales, except on the lips, which are rather strongly developed. Gill-rakers nearly as long as gill-laminæ, 9 on lower part of anterior arch. Dorsals IX–X, I 27–30, continuous or subcontinuous ; first spine extremely short, third longest, a little more than  $\frac{1}{2}$  length of head ; longest soft rays hardly  $\frac{1}{3}$  length of head. Anal II 7–8, originating under middle of second dorsal ; spines short. Pectoral a little shorter than head. Caudal lanceolate. 50–60 scales in longitudinal series. Silvery, olive or greenish on the back ; dark streaks along the oblique series of scales on the back and sides ; spinous dorsal greyish.

Total length 350 millim.

West Coast of Africa, from the Senegal to the Congo, entering rivers.—Type in Paris Museum.

1. Ad.

R. Bonny. .

J. Wood, Esq. (P.).

## 2. OTOLITHUS MACROGNATHUS.

*Pseudotolithus macrognathus*, Bleek. Nat. Verh. Ges. Haarlem, xviii. 1863, no. 2, p. 61, pl. xiii. fig. 2.

*Otolithus macrognathus*, Steind. Sitzb. Ak. Wien, lx. i. 1869, p. 690, pl. vii.

Very closely allied to the preceding, but depth of body about  $3\frac{1}{2}$  times in total length, upper profile very convex between snout and dorsal fin, and eye larger, as long as snout in adult, exceeding interocular width, and  $3\frac{1}{2}$  (young) to 5 times in length of head. Dorsals X, I 25–26.

Total length 280 millim.

Senegal to Congo.—Type in Leyden Museum.

1–4. Ad.	St. Louis, Senegal.	M. P. Delhez (C.).
5. Skel.	“ “	“
6. Yg.	Banana, Low. Congo.	Brussels Museum (E.).

## Fam. 5. SCORPIDIDÆ.

Aberrant Perciform fishes with subocular shelf, with teeth on the palate, separate lower pharyngeal bones, gill-membranes free from isthmus, 6 or 7 branchiostegal rays, and two nostrils on each side, as in the Serranidæ, but ribs all sessile, inserted behind the transverse processes when these are present. Spinous dorsal more or less developed, sometimes much reduced; anal with 3 spines. Ventrals, if well developed, with 1 spine and 5 soft rays, sometimes rudimentary or absent.

Coasts of Africa, Southern Asia, and Australasia. Represented in the fresh waters of Africa by the aberrant genus *Psettus*, three species of which are known to enter rivers.

## 1. PSETTUS.

Cuv. & Val. Hist. Poiss. vii. p. 240 (1831); Günth. Cat. Fish. ii. p. 486 (1860);

Klunz. Verh. zool.-bot. Ges. Wien, xx. 1870, p. 793.

*Monodactylus* (non Klein), Lacep. Hist. Poiss. iii. p. 131 (1802).

*Centropodus*, Lacep. t. c. p. 303.

*Acanthopodus*, part., Lacep. *op. cit.* iv. p. 557 (1802).

*Stromatoidea*, Casteln. Mém. Poiss. Afr. Austr. p. 44 (1861).

Body very deep and strongly compressed; scales very small, ctenoid; lateral line complete. Mouth moderately large, protractile; maxillary exposed; villiform teeth in jaws and on vomer, palatines, and tongue;



6 branchiostegal rays; pseudobranchiæ large. Dorsal and anal elongate and thickly scaled, the former with 7 or 8, the latter with 3 spines; anterior spines short and isolated, posterior elongate but only their extremity projecting from the scaly skin. Ventrals very small or rudimentary, below the pectorals. Vertebrae 23-24 (9-10+14). Air-bladder bifurcate behind.

Coasts of Africa, Southern Asia, and Australasia.

*Synopsis of the Species.*

- Depth of body  $1\frac{1}{2}$  to 2 times in total length;  
 D. VIII 27-30; A. III 27-30; 20-24 gill-rakers on lower part of anterior arch; ventral with 5 soft rays . . . . . 1. *P. falciformis*, Lacep., [p. 120.  
 Depth of body  $1\frac{1}{4}$  to  $1\frac{1}{2}$  times in total length;  
 D. VIII 28-30; A. III 29-32; 17-19 gill-rakers; ventral with 2 to 4 soft rays . . . . . 2. *P. argenteus*, L., p. 121.  
 Depth of body greater than length; D. VIII (rarely VII) 31-34; A. III 34-38; 20-24 gill-rakers;  
 ventral with or without 1 or 2 soft rays . . . . . 3. *P. sebæ*, C. & V., p. 123.

1. PSETTUS FALCIFORMIS.

*Monodactylus falciformis*, Lacep. Hist. Poiss. ii. pl. v. fig. 4 (1801), and iii. p. 132 (1802).

*Psettus commersonii*, Cuv. & Val. Hist. Poiss. vii. p. 250 (1831).

*Psettus falciformis*, Günth. Cat. Fish. ii. p. 488 (1860); Day, Fish. Ind. p. 234, pl. li. A. fig. 6 (1876); Sauv. Hist. Madag., Poiss. p. 334 (1891); M. Web. Zool. Jahrb., Syst. x. 1897, p. 142.

*Stromatoidea layardi*, Casteln. Mém. Poiss. Afr. Austr. p. 44 (1861).

*Psettus orbicularis*, Guichen. Mém. Soc. Sci. Cherbourg, xii. 1866, p. 136.

*Psettus argenteus*, part, Klunz. Fische Roth. Meer. p. 117 (1884).

Depth of body  $1\frac{1}{2}$  to 2 times in total length, length of head  $2\frac{2}{3}$  to  $3\frac{1}{3}$  times. Snout about  $\frac{1}{2}$  as long as eye, which is 2 to  $2\frac{1}{2}$  times in length of head and exceeds by  $\frac{1}{4}$  or  $\frac{1}{3}$  interorbital width; maxillary extending to below anterior fourth of eye; head entirely covered with very small scales. Gill-rakers long, 20-24 on lower part of anterior arch. Dorsal VIII 27-30; last spine  $\frac{1}{2}$ , or a little less than  $\frac{1}{2}$ , length of head; anterior soft rays much longer, forming an obtuse lobe. Anal III 27-30; third spine  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Ventral very small but well developed, with a spine and 5 soft rays. Caudal feebly emarginate. Caudal peduncle as long as deep or a little deeper than long. 50-60 tubes in lateral line. Silvery, back brownish; extremity of anterior dorsal and

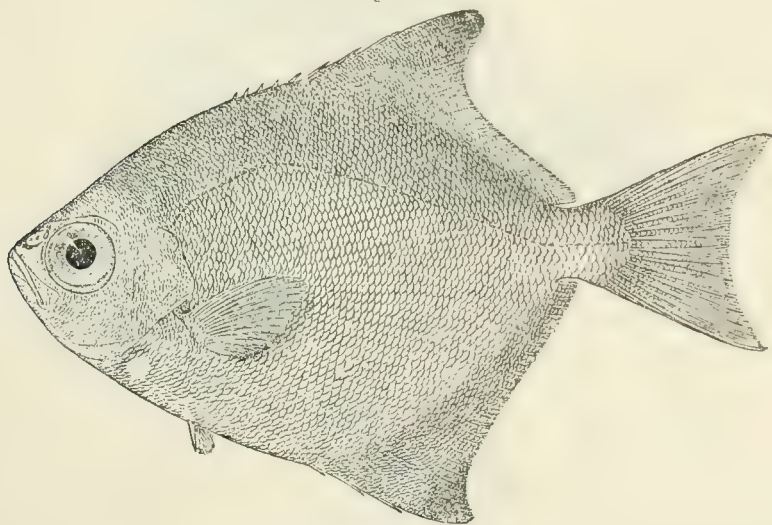
anal rays blackish; young with 7 or 8 brown vertical streaks, the first passing through the eye, and a broader band round the caudal peduncle.

Total length 160 millim.

From the Red Sea to South Africa, eastwards to Polynesia.—Type in Paris Museum.

1. Ad.	Red Sea.	
2. Ad.	Mombasa.	R. J. Cunningham, Esq. (P.).
3-4. Ad.	Durban.	Mr. T. Ayres (C.).
5-6. Yg.	Illovo R., near Durban, in fresh water.	Prof. M. Weber (P.).
7. Ad.	Algoa Bay.	J. M. Leslie, Esq. (P.).
8-14. Hgr.	R. Chalumna, near King Williamstown, 12 miles from sea.	Major H. Trevelyan (P.).
15. Skel.	R. Chalumna.	„

Fig. 89.



*Psettus falcipinnis*.

Algoa Bay.  $\frac{2}{3}$ .

## 2. PSETTUS ARGENTEUS.

*Chaetodon argenteus*, Linn. Amœn. Acad. iv. p. 249 (1759), and Syst. Nat. i. p. 461 (1766).

*Scomber rhombeus*, Forsk. Descr. Anim. p. 58 (1775).

*Centrogaster rhombeus*, Gmel. Syst. Nat. i. p. 1338 (1788).

*Centropodus rhombeus*, Lacep. Hist. Poiss. iii. p. 304 (1802).

*Acanthopodus argenteus*, Lacep. op. cit. iv. p. 558.

*Psettus rhombeus*, Cuv. & Val. Hist. Poiss. vii. p. 245 (1831); Val., Cuv. Règne Anim. Ill., Poiss. pl. xlii. fig. 2 (1836).

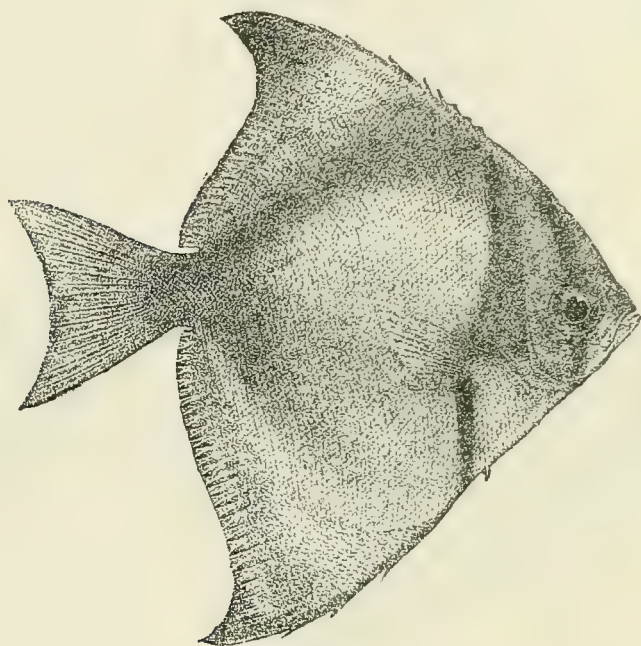
*Psettus argenteus*, Richards. Ereb. & Terr., Fish. p. 57, pl. xxxv. figs. 1-3 (1846); Günth. Cat. Fish. ii. p. 487 (1860); Kner, Novara, Fische, p. 164 (1869); Klunz. Verh. zool.-bot. Ges. Wien, xx. 1870, p. 794; Day, Fish. Ind. p. 235, pl. li. B. fig. 5 (1876); Günth. Fische Südsee, p. 140 (1876); Klunz. Fische Roth. Meer. p. 117 (1884), part.; Douglas Ogilby, Ed. Fishes N. S. Wales, p. 91 (1893).

*Monodactylus rhombeus*, Cantor, Cat. Mal. Fish. p. 172 (1850).

*Monodactylus argenteus*, Bleek. & Pollen, Fauna Madag., Poiss. p. 65 (1874).

Depth of body  $1\frac{1}{4}$  to  $1\frac{1}{2}$  times in total length, length of head 3 to

Fig. 90.



*Psettus argenteus*.  
India, after Day (*l. c.*).

$3\frac{2}{3}$  times. Snout much shorter than eye, which is  $2\frac{1}{2}$  to 3 times in length of head and equal to or a little greater than interorbital width; maxillary extending to below anterior border or anterior fourth of eye; head entirely covered with very small scales. 17-19 gill-rakers on lower part of anterior arch. Dorsal VIII 28-30; last spine  $\frac{2}{5}$  to  $\frac{3}{5}$  length of head; anterior soft rays moderately produced. Anal III 29-32; third spine  $\frac{2}{5}$  to  $\frac{3}{5}$  length of head. Ventral reduced to a small spine and 2 to 4 soft rays. Caudal feebly emarginate. Caudal peduncle

a little deeper than long. 50-60 tubes in lateral line. Silvery, back sometimes brownish; dorsal and anal fins brown or blackish in front; young with a dark brown band from the nape to the throat, passing through the eye, and another from the nape to between the ventral and the anal, over the base of the pectoral.

Total length 210 millim.

Red Sea and East Coast of Africa to Polynesia.

1. Ad., skin.	Zanzibar.	Sir L. Playfair (P.).
2, 3. Yg.	"	"
4. Yg.	Mouth of Zambesi.	Sir J. Kirk (P.).
5, 6-8. Ad., hgr., & yg.	Rodriguez.	G. Gulliver, Esq. (P.).
9. Hgr.	Rodriguez, fresh water.	"

### 3. PSETTUS SEBÆ.

*Chatodon rhombeus* (non Forsk.), Bloch, Schneid. Syst. Ichth. i. p. 235 (1801).

*Psettus sebæ*, Cuv. & Val. Hist. Poiss. vii. p. 241, pl. clxxxix. (1831); Günth. Cat.

Fish. ii. p. 486 (1860); Bleek. Nat. Verb. Ges. Haarlem, xviii. 1863, p. 68;

Steind. Sitzb. Ak. Wien, lx. i. 1869, p. 713, and Notes Leyd. Mus. xvi. 1894,

p. 19; Pellegr. Bull. Soc. Philom. (9) ix. 1907, p. 35.

*Gasterosteus rhombeus*, Forster, Descr. Anim. p. 7 (1844).

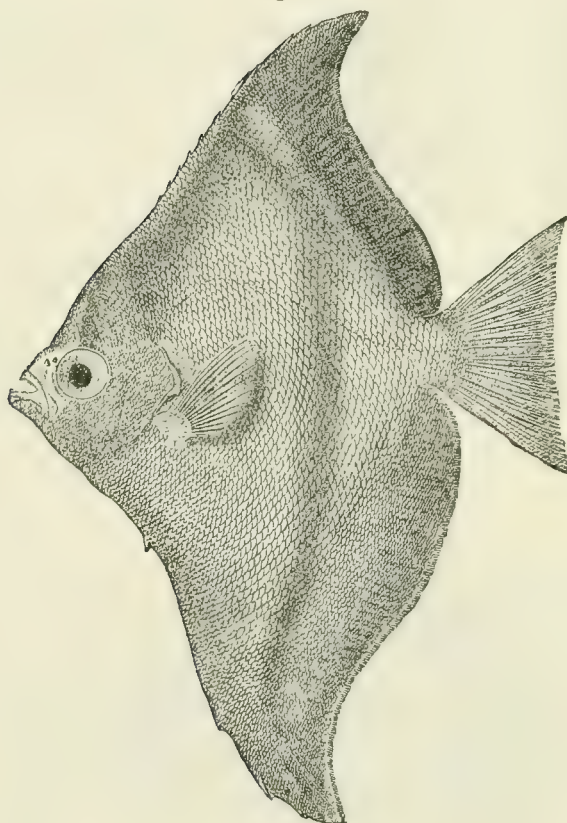
Body deeper than long; length of head  $2\frac{1}{2}$  to 3 times in total length. Snout much shorter than eye, which is  $2\frac{1}{2}$  to 3 times in length of head and equal to or a little greater than interorbital width; maxillary extending to below anterior border or anterior fourth of eye; head entirely covered with very small scales. Gill-rakers long, 20-24 on lower part of anterior arch. Dorsal VIII (rarely VII) 31-34; last spine  $\frac{2}{3}$  to once length of head; anterior soft rays produced, the fin falciform in front. Anal III 34-38; third spine nearly or quite as long as head. Pectoral  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head. Ventral reduced to a very small or minute spine, with or without one or two soft rays. Caudal truncate or slightly emarginate. Caudal peduncle nearly twice as deep as long. 48-55 tubes in lateral line. Silvery or brownish, uniform or with traces of three dark vertical bands, which are always present in the very young: the first passing through the eye, the second through the base of the pectoral, the third extending from the anterior soft rays of the dorsal to those of the anal.

Total length 160 millim.

West Coast of Africa, from the Senegal to the Congo.—Types in Paris Museum.



Fig. 91.

*Psettus sebw.*Type, after Cuvier and Valenciennes.  $\frac{3}{4}$ .

1-3. Ad. & yg.	St. Louis, Senegal.	M. P. Delhez (C.).
4-6. Hgr. & yg.	Lagos Lagoon.	Major G. E. Bruce (P.).
7. Skel.	Gold Coast.	
8. Hgr.	Nanna Kru, Liberia.	W. P. Lowe, Esq. (C.).
9. Ad.	Niger.	Mr. L. Fraser (C.).
10. Yg.	Niger Delta.	Mr. J. Paul Arnold (P.).
11-12. Yg.	Old Calabar.	"
13. Hgr.	Warri, Old Calabar.	Miss Kingsley (C.).
14. Skel.	Cameroon.	Hon. W. Rothschild (P.).
15-16. Ad.	Benito R., 15 miles from mouth.	G. L. Bates, Esq. (C.).
17. Hgr.	Gaboon.	R. B. N. Walker, Esq. (P.).
18. Ad.	Lucola R., near Cabinda.	Dr. W. J. Ansorge (C.).
19-20. Ad.	Banana, Congo.	M. P. Delhez (C.).
21. Hgr.	" "	Capt. Wilverth (C.).
22-23. Hgr.	" "	Dr. Jackson (C.);
		Hon. W. Rothschild (P.).
24, 25, 26. Ad.	W. Africa.	

## Fam. 6. PRISTIPOMATIDÆ.

Perciform fishes with the suborbitals not produced into a subocular lamina, without teeth on the palate, separate lower pharyngeal bones, gill-membranes free from isthmus, 5 to 7 branchiostegal rays, and two nostrils on each side. Spinous dorsal well developed, usually as long as or longer than the soft, which is often much longer than the anal; latter usually with 3 spines. Præcaudal vertebræ with transverse processes from the third, these processes bearing the ribs.

Seas of the temperate and tropical regions, a few species in fresh waters.

Representatives of three genera enter rivers in Africa.

I. Maxillary nearly entirely concealed when the mouth is closed.

A central groove behind the symphysis of the lower

jaw; ventrals below base of pectorals . . . 1. *Pristipoma*, Cuv., p. 125.

Lower jaw with pits, but without central groove;

ventrals a little behind vertical of base of

pectorals . . . . . 2. *Diagramma*, Cuv., p. 127.

II. Maxillary exposed.

Ventrals below base of pectorals . . . . . 3. *Otoperca*, Blgr., p. 130.

## 1. PRISTIPOMA.

Cuv. Règne Anim. 2nd ed. ii. p. 176 (1829); Cuv. & Val. Hist. Poiss. v. p. 243 (1830); Günth. Cat. Fish. i. p. 286 (1859); Bouleng. Poiss. Bass. Congo, p. 386 (1901).

Body oblong, compressed; scales moderate or rather large, ctenoid; lateral line complete. Mouth moderately large, protractile; maxillary folding under the præorbital; bands of villiform teeth in the jaws; a central groove behind the symphysis of the lower jaw; præoperculum denticulate; no opercular spines. 7 branchiostegal rays; pseudo-branchiæ large. Dorsal with 11 to 14 spines, anal with 3, both fins with a scaly sheath at the base. Ventrals below base of pectorals, with a scaly basal process. Vertebræ 26-27 (10-11+16).

Tropical and subtropical seas, Mediterranean.

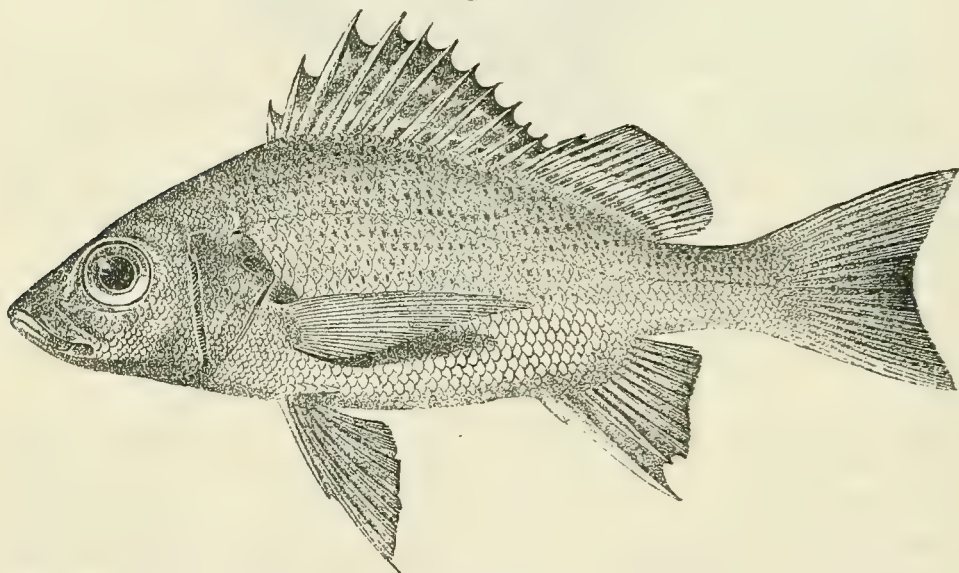
One species has been reported from West African rivers in perfectly fresh water.

## 1. PRISTIPOMA JUBELINI.

Cuv. & Val. Hist. Poiss. v. p. 250 (1830); Bleek. Nat. Verh. Ges. Haarlem, xviii. 1863, no. 2, p. 54, pl. xii. fig. 2; Steind. Sitzb. Ak. Wien, lx. i. 1869, p. 675, pl. ii., and Notes Leyd. Mus. xvi. 1894, p. 7; Bouleng. Poiss. Bass. Congo, p. 387 (1901).

Depth of body  $2\frac{3}{4}$  to  $3\frac{1}{3}$  times in total length, length of head 3 to  $3\frac{1}{5}$  times. Snout with straight upper profile, as long as or a little longer than eye, which is 3 (young) to 4 times in length of head and  $1\frac{1}{4}$  to  $1\frac{1}{3}$  times in interocular width; maxillary extending to below

Fig. 92.

*Pristipoma jubelini.*

Senegal, after Steindachner (*l. c.*).  $\frac{2}{3}$ .

nostrils or anterior border of eye; snout naked, remainder of head covered with scales. 13–15 gill-rakers on lower part of anterior arch. Dorsal XI–XII 15–16; spines very strong, increasing in length to the fourth, which measures  $\frac{2}{3}$  to  $\frac{2}{3}$  length of head and exceeds longest soft rays. Anal III 8–9; second spine very strong and longest,  $\frac{2}{3}$  to  $\frac{2}{3}$  length of head. Pectoral as long as or a little longer than head. Caudal emarginate. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times as long as deep. Scales 50–60  $\frac{6-8}{15-18}$ . Silvery, back bluish grey, with more or less distinct blackish dots following the oblique series of scales; a blackish opercular

spot; a series of round blackish spots at the base of the dorsal fin, between the rays, sometimes with a second series higher up.

Total length 290 millim.

West Coast of Africa, from the Senegal to Angola.—Type in Paris Museum.

1-6. Ad. & yg.	St. Louis, Senegal.	M. P. Delhez (C.).
7. Hgr.	Nanna Kru, Liberia.	W. P. Lowe, Esq. (C.).
8. Hgr.	Degama, Lower Niger.	Dr. W. J. Ansorge (C.).
9-10. Hgr.	Niger.	Mr. J. T. Dalton (C.).
11. Skel.	"	"
12. Ad.	"	W. A. Forbes, Esq. (P.).
13. Ad.	Benito R.	G. L. Bates, Esq. (C.).
14. Yg.	Chiloango Town.	Dr. W. J. Ansorge (C.).
15. Hgr.	Chiloango R. at Mayili.	"
16. Ad.	Loango R., at N'kutu.	"
17. Yg.	Landana, Lower Congo.	Dr. Jackson (C.); Hon. W. Rothschild (P.).
18-19. Yg.	Banana, Lower Congo.	Capt. Wilverth (C.).
20-21. Ad. & hgr.	Angola.	R. J. Cunninghame, Esq. (P.).
22. Ad.	Quanza R., at Cunga, Angola.	Dr. W. J. Ansorge (C.).
23-24. Yg.	Bengo R., at Quifan- gondo, Angola.	"

## 2. DIAGRAMMA.

Cuv. Règne Anim. 2nd ed. ii. p. 176 (1829); Cuv. & Val. Hist. Poiss. v. p. 290 (1830); Günth. Cat. Fish. i. p. 318 (1859); Bouleng. Poiss. Bass. Congo, p. 388 (1901).

Body oblong, compressed; scales small or moderately large, ctenoid; lateral line complete. Mouth rather small, protractile, horizontal; maxillary folding under the præorbital; bands of villiform teeth in the jaws; 4 to 6 pits on the chin; præoperculum denticulate; no opercular spines. 6 or 7 branchiostegal rays; pseudobranchiæ large. Dorsal with 9 to 14 spines, anal with 3. Ventrals a little behind vertical of base of ventrals, with a scaly basal process. Vertebrae 26-27 (11+15-16).

Tropical and subtropical seas, Mediterranean, some species entering fresh waters. Two of these are dealt with here:—



- D. XII–XIII 18–21; Sc. 80–100  $\frac{10-13}{25-28}$ ; second anal spine longer than longest dorsal; caudal truncate or feebly emarginate . . . . . 1. *D. griseum*, C. & V., p. 128.
- D. XIV 16; Sc. 55–60  $\frac{7-8}{18-23}$ ; second anal spine nearly as long as longest dorsal; caudal rounded . . . . . 2. *D. macrolepis*, Blgr., p. 129.

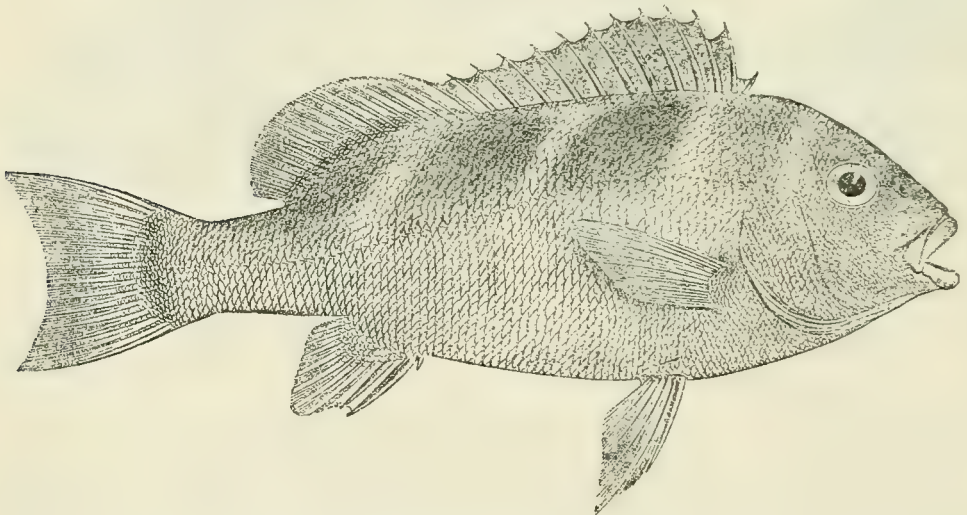
### 1. DIAGRAMMA GRISEUM.

Cuv. & Val. Hist. Poiss. v. p. 306 (1860); Günth. Cat. Fish. i. p. 321 (1859); Playf. & Günth. Fish. Zanzib. p. 26, pl. iv. fig. 3 (1866); Playf. Proc. Zool. Soc. 1867, p. 850; Day, Fish. Ind. p. 81, pl. xxi. fig. 2 (1875), and Suppl. p. 785 (1888); Bouleng. Proc. Zool. Soc. 1889, p. 245.

*Diagramma jayakari*, Bouleng. Proc. Zool. Soc. 1887, p. 656.

Depth of body  $2\frac{1}{4}$  to  $2\frac{3}{4}$  times in total length, length of head 3 to  $3\frac{1}{3}$  times. Upper profile of head curved; snout as long as or a little

Fig. 93.



*Diagramma griseum*.

After Playfair and Günther (*l. c.*).  $\frac{4}{5}$ .

longer than eye, which is  $2\frac{2}{3}$  (young) to  $3\frac{1}{4}$  times in length of head and equals or a little exceeds interocular width; mouth extending to below nostrils or anterior border of eye; lips thick; 4 pits on the chin; posterior border of præoperculum rather strongly denticulated; operculum with two blunt points; part of snout naked, remainder of head covered with scales. 16–17 gill-rakers on lower part of anterior arch. Dorsal XII–XIII 18–21; spines rather strong, increasing in length to

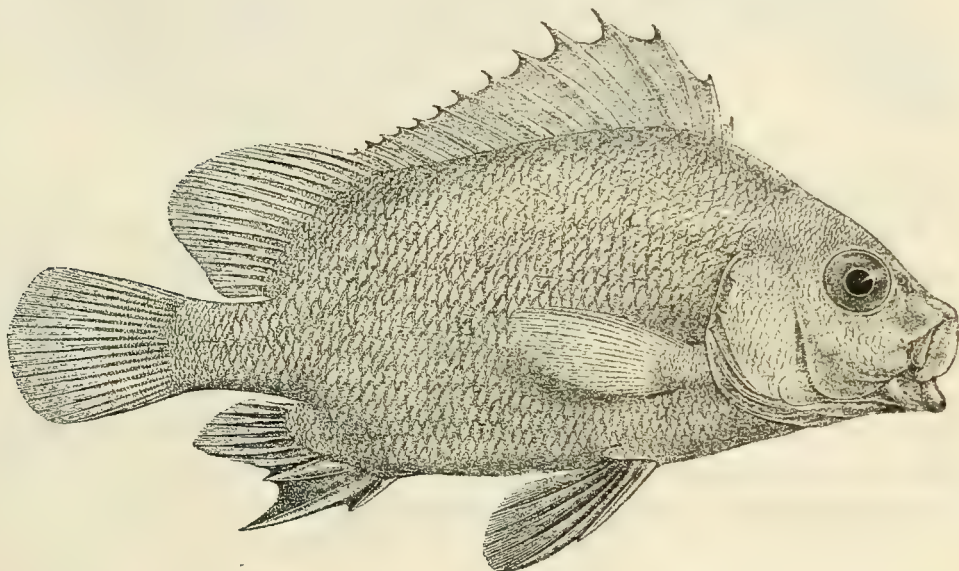
the fourth, which measures  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head and equals longest soft rays. Anal III 7-8; second spine very strong, longest, longer than any of the dorsals. Pectoral about  $\frac{2}{3}$  length of head. Caudal truncate or feebly emarginate. Caudal peduncle as long as deep. Scales 80-100  $\frac{10-13}{25-28}$ . Greyish brown, uniform or with a darker network, or with light transverse streaks.

Total length 260 millim.

East Coast of Africa to Coasts of India.—Type in Paris Museum.

- |                               |                                    |                       |
|-------------------------------|------------------------------------|-----------------------|
| 1. Hgr.                       | Zanzibar.                          | Sir L. Playfair (P.). |
| 2-5. Ad., hgr., & yg., skins. | "                                  | "                     |
| 6. Yg.                        | Seychelles, in a mountain torrent. | "                     |

Fig. 94.



*Diagramma macrolepis.*  
Type (A. M. C.).  $\frac{5}{8}$ .

## 2. DIAGRAMMA MACROLEPIS.

Bouleng. Ann. Mus. Congo, Zool. i. p. 50, pl. xxvi. (1899), and Poiss. Bass. Congo, p. 388 (1901).

*Diagramma crassispinum* (non Rüpp.), Steind. Notes Leyd. Mus. xvi. 1894, p. 6.

Depth of body  $2\frac{1}{5}$  to  $2\frac{2}{5}$  times in total length, length of head  $3\frac{1}{5}$  to  $3\frac{1}{2}$  times. Upper profile of head descending in a steep curve; snout as long as or a little shorter than eye, which is 3 to 4 times in length of

head and equals interocular width; mouth extending to below nostril or anterior border of eye; lips very thick; 4 pits on the chin; posterior border of præoperculum strongly denticulated; operculum with two blunt points; snout naked, remainder of head covered with scales. 18 gill-rakers on lower part of anterior arch. Dorsal XIV 16; spines very strong, increasing in length to the fourth or fifth, which measures  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head, and nearly equals longest soft rays. Anal III 6-7; second spine very strong, longest, nearly as long as longest dorsal. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Caudal rounded. Caudal peduncle scarcely longer than deep. Scales 55-60  $\frac{7-8}{18-23}$ . Dark brown to purplish black, lighter under the head and on the belly.

Total length 400 millim.

West Coast of Africa, from the Senegal to the Congo.—Type in Congo Museum, Tervueren.

1-2. Ad.	St. Louis, Senegal.	M. P. Delhez (C.).
3. Hgr.	Mouth of Benito R.	Madrid Museum (E.).

### 3. OTOPERCA, g. n.

*Larimus*, part., Günth. Cat. Fish. ii. p. 266 (1860).

Body oblong, compressed; scales moderate, ctenoid; lateral line complete. Mouth moderately large, protractile; maxillary exposed when the mouth is closed; bands of villiform teeth in the jaws; præoperculum denticulate; no opercular spines. 7 branchiostegal rays; pseudobranchiæ large. Dorsal with 12 spines, anal with three, both fins with a scaly sheath at the base. Ventrals below base of pectorals, with a scaly basal process. Vertebrae 26 (10+16).

A single species, marine, but entering rivers.

#### 1. OTOPERCA AURITA.

*Larimus auritus*, Cuv. & Val. Hist. Poiss. viii. p. 501 (1831); Günth. Cat. Fish. ii. p. 266 (1860).

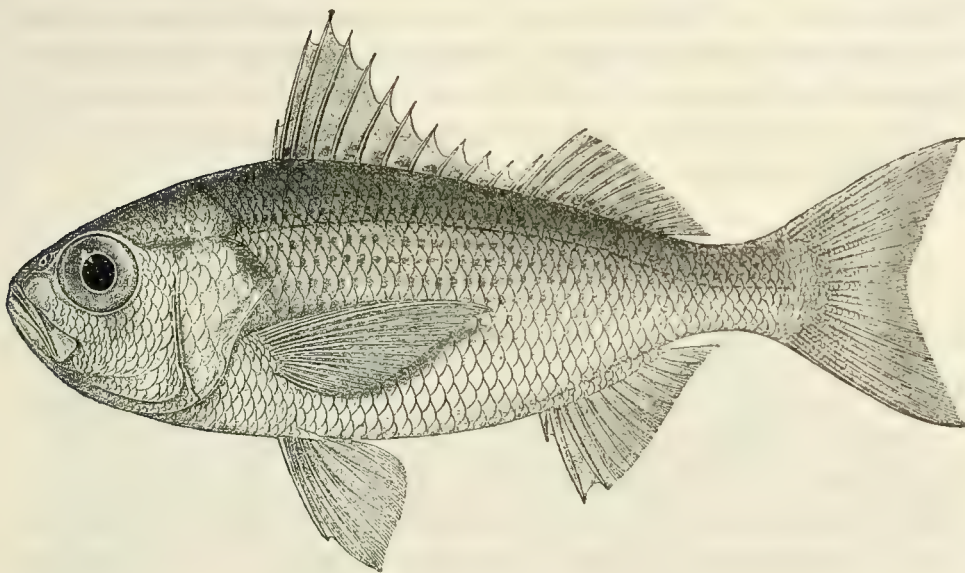
*Pristipoma macrophthalmum*, Bleek. Nat. Verh. Ges. Haarlem, xviii. 1863, no. 2, p. 52, pl. xii. fig. 1; Steind. Sitzb. Ak. Wien, lx. i. 1869, p. 684, and Notes Leyd. Mus. xvi. 1894, p. 9.

Depth of body  $2\frac{2}{3}$  to 3 times in total length, length of head 3 to  $3\frac{1}{2}$  times. Snout with convex upper profile, much shorter than eye, which is  $2\frac{1}{2}$  (young) to 3 times in length of head and equals or a little exceeds interocular width; maxillary extending to below anterior third



or centre of eye; snout naked, remainder of head covered with scales. 20-22 gill-rakers on lower part of anterior arch. Dorsal XII 11-13; spines moderately strong, third or third and fourth longest,  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head and exceeding longest soft rays. Anal III 8-9; second and third spines equal,  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head. Pectoral as long

Fig. 95.



*Otoperca aurita*.  
Ambas Bay.  $\frac{2}{3}$ .

as head. Caudal rather deeply emarginate. Caudal peduncle about  $1\frac{1}{2}$  times as long as deep. Scales 48-52  $\frac{4-5}{11-12}$ . Silvery, brown or olive on the back; a blackish opercular spot; a rather indistinct series of round dark spots on the base of the dorsal fin.

Total length 180 millim.

West Coast of Africa, from Senegambia to Angola.—Type in Paris Museum.

1-3. Ad. & yg.	Niger.	Mr. L. Fraser (C.).
4. Skel.	"	"
5-6. Ad.	Ambas Bay, Cameroon.	Miss Kingsley (C.).
7. Ad.	Coast of Angola.	Dr. W. J. Ansorge (C.).



## Fam. 7. SPARIDÆ.

Perciform fishes with a subocular shelf, usually without teeth on the palate, the teeth in the jaws often either cutting in front or molar-like on the sides, separate lower pharyngeal bones, gill-membranes free from isthmus, 5 to 7 branchiostegal rays, and two nostrils on each side. Spinous dorsal well developed, the soft not much more developed than the anal; latter with 3 spines. Præcaudal vertebræ with transverse processes from the second or third, these processes bearing the ribs.

Seas of the temperate and tropical regions; one representative in the fresh waters of Africa.

## 1. SPARUS.

Linn. Syst. Nat. i. p. 467 (1766), part.; Cuv. Règne Anim. ii. p. 271 (1817), part.

*Pagrus*, Cuv. t. c. p. 272; Cuv. & Val. Hist. Poiss. vi. p. 141 (1830); Günth. Cat. Fish. i. p. 465 (1859).

*Chrysophrys*, Cuv. & Val. t. c. p. 81; Günth. t. c. p. 483.

Body oblong or short, compressed; scales moderate, feebly ctenoid; lateral line complete. Mouth moderate or rather large, protractile; maxillary folding under the præorbital; canine teeth in front of the jaws and rounded, molar-like teeth in two or three rows on the sides. 6 branchiostegal rays; pseudobranchiæ large. Dorsal with 11 or 12 spines, anal with 3, both fins with a scaly sheath at the base. Ventrals below base of pectorals, with a scaly basal process. Vertebræ 24 (10+14).

Distributed over the tropical and temperate seas of the world.

## 1. SPARUS VAGUS.

*Chrysophrys vagus*, Peters, Mon. Berl. Ac. 1852, p. 681, and Reise Mossamb. iv. p. 11, pl. ii. fig. 1 (1868).

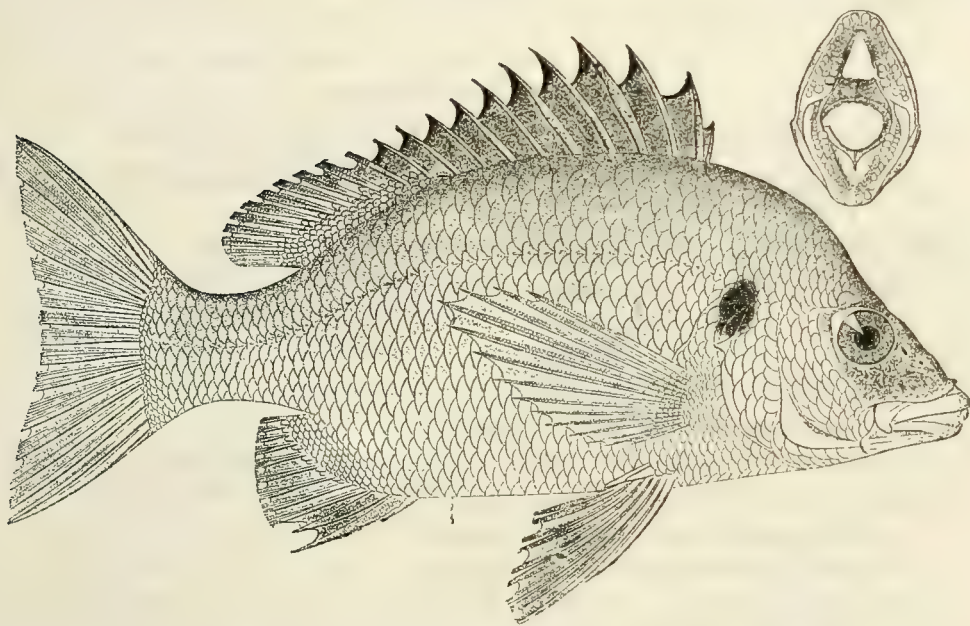
Depth of body about  $2\frac{1}{2}$  times in total length, length of head about 3 times. Snout with straight upper profile; snout a little longer than eye, which is 4 times in length of head; upper jaw projecting a little beyond lower; maxillary extending to below anterior third of eye; lips thick; six conical, curved teeth in front of each jaw; molariform teeth on the sides in 3 rows in upper jaw, in 2 in lower; 6 series of scales on

the cheek. Dorsal XI 12; spines strong, increasing in length to the fourth, which measures a little more than  $\frac{1}{2}$  length of head and exceeds longest soft rays. Anal III 9; second spine strongest and a little longer than third. Pectoral as long as head. Caudal feebly emarginate. Scales 49 in the lateral line, 5 between the latter and the anterior dorsal spines. Silvery; a black opercular spot; spinous dorsal black-edged, other fins reddish.

Total length 280 millim.

Lower Zambesi and Licuara Rivers.—Types in Berlin Museum.

Fig. 96.



*Sparus vagus.*

Type, after Peters (*l. c.*).  $\frac{1}{2}$ .

## Fam. 8. CICHLIDÆ.

Perciform fishes with the suborbitals not produced into a subocular lamina, without teeth on the palate, the lower pharyngeal bones more or less completely united, but with median suture, gill-membranes free from isthmus, 5 or 6 branchiostegal rays, no pseudobranchiæ, and a single nostril on each side. Spinous dorsal well developed, usually longer than the soft; anal with 3 spines or more. Præcaudal vertebræ with transverse processes from the third; ribs most frequently sessile or subsessile.

Fresh or brackish waters of Africa, Syria, India and Ceylon, and America. Mostly from Tropical Africa and Tropical America.

The classification of the very numerous African members of this family presents the greatest difficulties, and the division into genera, as here followed, is unsatisfactory and open to criticism, the dentition in certain species being subject to variation, according to age, or even of a purely individual nature. This has to be borne in mind in making use of the following Synopsis. I have also been compelled to abandon the hope I entertained (Poiss. Bass. Congo, p. 393) of basing a more natural classification on the number of præcaudal vertebræ as compared to that of the caudals.

### *Synopsis of the Genera.*

I. Dorsal and anal fins without scaly sheath at the base.

A. Outer teeth bi- or tricuspid, rarely conical \*, without canines in front, not swollen at the base.

- |  |   |
|--|---|
| Teeth forming narrow or moderately broad bands, the outer bicuspid, rarely conical ; dorsal with 11-19 spines, anal with 3 or 4 . . . . .  | 1. <i>Tilapia</i> , A. Smith, p. 138.   |
| Teeth forming very broad bands, all tricuspid ; dorsal with 16-20 spines, anal with 3 . . . . .  | 2. <i>Petrochromis</i> , Blgr., p. 267. |
| Teeth forming very broad bands, all tricuspid ; dorsal with 13 spines, anal with 3 . . . . .   | 3. <i>Cunningtonia</i> , Blgr., p. 273. |
| Teeth forming broad bands, those of the outer series bicuspid in front, conical, enlarged, and sharply differentiated on the sides of the præmaxillaries ; dorsal with 17-19 spines, anal with 3 . . . . .                       | 4. <i>Simochromis</i> , Blgr., p. 274.  |
| Teeth forming broad bands in front, those of the outer series bicuspid ; sides of præmaxillaries with a single series of conical, enlarged, and sharply differentiated teeth ; dorsal with 20-21 spines, anal with 4-6 . . . . . | 5. <i>Tropheus</i> , Blgr., p. 276.     |
| Mouth inferior, with two series of small tricuspid teeth ; body much attenuate in the caudal region ; dorsal with 14 spines, anal with 3 . . . . .   | 6. <i>Asprotilapia</i> , Blgr., p. 278. |

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\* *Tilapia*, species mentioned in footnote, p. 138. See also Divisions C and D of this Synopsis.



B. Some or all of the anterior teeth large and incisor-like or nail-like in the adult.

3 to 5 series of compressed teeth, which are feebly notched or tricuspid in the young and obtuse in the adult; dorsal with 17–19 spines, anal with 3 . . . . . 7. *Lobochilotes*, Blgr., p. 280.

A very broad band of teeth, the outer large, nail-shaped, the others small and tricuspid; dorsal with 16–17 spines, anal with 3 . . . 8. *Docimodus*, Blgr., p. 281.

2 widely separated series of notched teeth, the outer large, with one or two pairs of larger, incisor-like teeth at the symphysis; dorsal with 19–20 spines, anal with 3 . . . 9. *Steatocranus*, Blgr., p. 283.

C. Outer teeth bicuspid in some individuals, conical in others (forms connecting *Tilapia* and *Paratilapia*); dorsal with 13–19 spines, anal with 3–6 . . . . . 10. *Haplochromis*, Pfeff., p. 284.

D. Outer teeth conical in the adult, sometimes bicuspid in the young \*, with or without curved canines.

1. Anal with 3 spines (exceptionally 4).

a. Outer teeth, if closely set, not strongly incurved.

α. Two lateral lines; ventrals with the outer rays longest.

\* Outer mandibular teeth not pointing outwards.

Two or more series of teeth in each jaw; no strong papillose pad in front of the gill-arches; dorsal with 10–18 spines, anal with 6–14 soft rays . . . . . 11. *Paratilapia*, Blkr., p. 308.

Upper lateral line close to base of spinous dorsal; otherwise as in *Paratilapia*. . . . 12. *Nannochromis*, Pellegr., p. 375.

A very strong papillose pad in front of the gill-arches; otherwise as in *Paratilapia* . . 13. *Pelmatochromis*, Sldr., p. 377.

Jaws with very broad bands of small teeth, the band in the upper jaw horseshoe-shaped, that in each ramus of the lower jaw not much longer than broad; dorsal with 13–15 spines . . . . . 14. *Platyteniodus*, Blgr., p. 426.

Teeth in one or two, very rarely three series, the two median teeth of the outer series more or less enlarged; dorsal with 13–15 spines . . . . . 15. *Hemichromis*, Peters, p. 427.

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\* *Paratilapia*, *Pelmatochromis*.



Teeth of outer series very large and widely spaced ; præmaxillaries expanded at the symphysis, beak-like ; dorsal with 16-20 spines, anal with 9-11 soft rays . . . . 16. *Champsochromis*, Blgr., p. 433.

Teeth fang-like, in 2 to 4 series, the inner depressible, hinged at the base ; scales very small and irregular ; dorsal with 13-17 spines, anal with 14-18 soft rays . 17. *Bathybates*, Blgr., p. 436.

Mouth nearly vertical, directed upwards, with a single series of small teeth ; dorsal with 17-18 spines . . . . . 18. *Haplotaxodon*, Blgr., p. 443.

\*\* Outer mandibular teeth pointing outwards, perpendicular to the inner ; dorsal with 13-16 spines.

Membrane between dorsal and anal spines with rectilinear edge, not forming lappets . . 19. *Cyrtocara*, Blgr., p. 445.

Dorsal and anal with lappets . . . . . 20. *Ectodus*, Blgr., p. 446.

β. Two lateral lines ; ventrals with the inner rays longest ; dorsal with 13-15 spines.

Teeth in 2 series, outer mandibular pointing outwards . . . . . 21. *Enantiopus*, Blgr., p. 447.

Teeth in 4 or 5 series, outer mandibular not pointing outwards . . . . . 22. *Stappersia*, Blgr., p. 450.

γ. Three lateral lines ; dorsal with 13-15 spines.

Ventrals with the inner rays longest ; outer mandibular teeth pointing outwards . . 23. *Xenotilapia*, Blgr., p. 451.

Ventrals with the outer rays longest ; outer mandibular teeth not pointing outwards . 24. *Grammatotria*, Blgr., p. 453.

δ. A single, very short lateral line (the upper) ; dorsal with 9-12 spines.

Teeth very minute ; head with large and deep cavities . . . . . 25. *Trematocara*, Blgr., p. 455.

b. Outer teeth closely set and strongly incurved, followed by a band of very small tricuspid teeth ; dorsal with 17 spines . . . . . 26. *Gephyrochromis*, Blgr., p. 458.

2. Anal with 4-10 spines.

Teeth conical, forming a villiform band with more or less strongly enlarged canines in front ; dorsal with 16-21 spines. . . . 27. *Lamprologus*, Schilth., p. 459.

Teeth conical, forming a villiform band with a few strongly curved canines in front, the outer of which are very large and tusk-like ; dorsal with 22-24 spines . . . . 28. *Julidochromis*, Blgr., p. 484.

An outer series of large conical teeth and a  
broad band of small tricuspid teeth ;  
dorsal with 18-22 spines . . . . . 29. *Telmatochromis*, Blgr., p. 485.

E. Dentition not falling under any of the above definitions.

1. Teeth not strongly curved, with compressed crowns.

a. Dorsal with 15-17 spines.

Outer teeth large and few (24 in upper jaw)  
with long inner cusp directed inwards  
and very short or indistinct outer cusp . 30. *Bayonia*, Blgr., p. 488.

Jaws with moderately broad bands of slender,  
club-shaped teeth, the outer with the  
crown obliquely truncate and pointing  
towards the symphysis. . . . . 31. *Hemitilapia*, Blgr., p. 489.

Jaws with very broad bands of bristle-like  
movable teeth with club-shaped crowns ;  
rami of lower jaw approximated, spatulate  
in front, connected with the upper jaw by  
a broad thin lip . . . . . 32. *Chilochromis*, Blgr., p. 492.

Jaws very massive, with extremely broad bands  
of innumerable minute teeth . . . . . 33. *Corematodus*, Blgr., p. 494.

b. Dorsal with 18-25 spines.

Large spatulate teeth with truncate crowns  
disposed in oblique transverse rows of  
two or three ; dorsal with 23-25 spines . 34. *Eretmodus*, Blgr., p. 495.

A single series of large teeth with elongate  
cylindrical shafts and expanded rounded-  
subtruncate crowns ; dorsal with 23  
spines . . . . . 35. *Spathodus*, Blgr., p. 496.

Teeth in a single series, rather large, unequal in  
size, few (20 in upper jaw), with swollen  
bases and short slightly notched crowns ;  
dorsal with 18 spines . . . . . 36. *Perissodus*, Blgr., p. 497.

2. Teeth neither curved nor compressed.

Teeth in several series, with obtuse or rounded  
crowns ; dorsal with 15 spines . . . . . 37. *Chilotilapia*, Blgr., p. 498.

3. Teeth with strongly curved, compressed crowns.

Teeth in two series, 50-54 in outer series of  
upper jaw ; dorsal with 15-16 spines . . 38. *Schubotzia*, Blgr., p. 500.

Teeth in a single series, 34-46 in upper jaw,  
feebly grooved in front ; dorsal with 16-  
17 spines . . . . . 39. *Xenochromis*, Blgr., p. 501.

Teeth in a single series, 14-20 in upper jaw,  
grooved in front; dorsal with 18-20 spines. 40. *Plecodus*, Blgr., p. 503.

II. Dorsal and anal fins with a scaly sheath at the base.

Teeth with blunt crowns, in a single series, two  
or four middle ones enlarged; dorsal with  
16-20 spines, anal with 8-10 . . . 41. *Paretroplus*, Blkr., p. 504.

### 1. TILAPIA.

*Chromis*, part., Cuvier, Règne Anim. ii. p. 266 (1817); Günth. Cat. Fish. iv. p. 267 (1862).

*Tilapia*, A. Smith, Ill. Zool. S. Afr., Fish. (1840); Bouleng. Proc. Zool. Soc. 1899, p. 105, part., and Poiss. Bass. Congo, p. 452 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 307; Bouleng. Fish. Nile, p. 513 (1907).

*Sarotherodon*, Rüpp. Verz. Mus. Senek. iv. p. 21 (1852); Günth. Cat. iv. p. 273.

*Coptodon*, Gervais, Bull. Soc. Agric. Hérault, 1853, p. 81.

*Haligenes*, Günth. Proc. Zool. Soc. 1859, p. 471.

*Ptychochromis*, Steind. Sitzb. Ak. Wien, lxxxii. i. 1880, p. 248; Pellegr. t. c. p. 346.

*Oreochromis*, Günth. Proc. Zool. Soc. 1889, p. 70; Pellegr. t. c. p. 354.

*Ctenochromis*, part., Pfeff. Jahrb. Hamb. Wiss. Anst. x. 1893, p. 149.

*Ophthalmotilapia*, Pellegr. t. c. p. 345.

Body short or more or less elongate; scales cycloid or ctenoid; two incomplete lateral lines. Teeth in 2 or more series, the outer bicuspid\*, the others tricuspid; maxillary usually more or less completely hidden under the præorbital when the mouth is closed†. Dorsal fin with 11 to 19 spines, anal with 3 or 4. Parietal and occipital crests strong, extending to between the orbits. Vertebrae 26-34‡.

Africa and Syria.

\* Occasionally conical or indistinctly bicuspid in a few species which are related to *T. nilotica* (*T. nigra*, *mossambica*, *natalensis*, *linnelli*, *squamipinnis*). See also *Haplochromis*.

† Exceptions in *T. buettikoferi*, *fasciata*, *burtoni*, *acuticeps*, *swynnertoni*, *lucullæ*, *horii*.

‡ Numbers of vertebrae in species with cycloid scales:—

14+12=26. *T. macrocephala*.

14+15=29. *T. percivali*.

15+13=28. *T. dolloi*, *melanopleura*, *cabræ*, *sparmani*.

16+12=28. *T. eduardiana*, *heudeloti*, *marice*, *zillii*, *buettikoferi*.

16+13=29. *T. melanopleura*, *zillii*, *brevimanus*.

16+14=30. *T. shirana*, *natalensis*.

17+13=30. *T. galilæa*, *andersonii*.

17+15=32. *T. nilotica*, *galilæa*.

17+16=33. *T. squamipinnis*.

*Synopsis of the Species.*

## I. Scales cycloid (rarely indistinctly ctenoid).

## A. Gill-rakers 15-27 on lower part of anterior arch.

1. Anal spines 4; pectoral not longer than head, not extending beyond origin of anal; 2 or 3 series of scales on the cheek; 17-21 gill-rakers.

## D. XVI-XVII 11-12; A. IV 10-11; Sc. 34-

$36 \frac{5}{14-15}$ ; mouth extending to between nostril and eye; latter 5 times in length of head in adult; caudal peduncle a little longer than deep. . . . .

1. *T. hunteri*, Gthr., p. 149.

## D. XVI-XVII 10-13; A. IV 9-10; Sc. 30-

$32 \frac{3-3\frac{1}{2}}{13-14}$ ; mouth extending to between nostril and eye; latter  $4-4\frac{1}{2}$  times in length of head; caudal peduncle not longer than deep. . . . .

2. *T. shirana*, Blgr., p. 151.

D. XVII 11-12; A. IV 9; Sc.  $32 \frac{3-4}{13}$ ; mouth

extending nearly to below anterior border of eye; latter 5 to  $5\frac{1}{2}$  times in length of head; caudal peduncle deeper than long. . . . .

3. *T. nigra*, Gthr., p. 152.

2. Anal spines 3 (very rarely 4); pectoral usually as long as or longer than head, often reaching vertical of origin of anal or beyond.

## a. Caudal not densely scaled.

 $\alpha$ . Outer teeth small and slender, or unicuspid.

- \* Caudal peduncle as long as deep; 4 series of scales on the cheek; 25 gill-rakers.

D. XVII 13; A. III 11; Sc.  $33 \frac{4\frac{1}{2}}{16}$ ; caudal

rounded. . . . . 4. *T. kafuensis*, Blgr., p. 153.

## Species with ctenoid scales:—

13+16=29. *T. calliptera*.

13+17=30. *T. nigricans*.

14+14=28. *T. oligacanthus*.

14+15=29. *T. burtoni*.

14+16=30. *T. horii*, *pallida*, *nubila*, *pappenheimi*.

14+17=31. *T. lethrinus*, *lucrimosa*, *bayoni*, *macrophthalmus*.

15+15=30. *T. luculle*.

15+16=31. *T. simotes*.

15+17=32. *T. kirkii*.

16+17=33. *T. pleurotenia*.

17+17=34. *T. dardennii*, *grandoculis*.



\*\* Caudal peduncle as long as deep, rarely a little deeper than long; 2 or 3 series of scales on the cheek; 15-23 gill-rakers; pectoral usually not much longer than head.

D. XV-XVI 10-11; A. III (IV) 9-10; Sc. 30-

$33 \frac{3\frac{1}{2}-4\frac{1}{2}}{12-15}$ ; mouth large, at least  $\frac{3}{4}$  width of head, extending to below eye, or not quite so far; caudal rounded in the adult . . .

5. *T. mossambica*, Peters, p. 154.

D. XV-XVI 12-13; A. III 10; Sc. 28-

$31 \frac{3\frac{1}{2}}{12}$ ; mouth large, extending to below anterior border of eye, or a little beyond; caudal truncate . . .

6. *T. vorax*, Pfeff., p. 156.

D. XV-XVIII 10-12; A. III 9-11; Sc. 30-

$34 \frac{3\frac{1}{2}-4\frac{1}{2}}{13-17}$ ; mouth  $\frac{2}{3}$  to  $\frac{3}{4}$  width of head, extending to between nostril and eye; caudal truncate or slightly emarginate (angles sometimes rounded) . . .

7. *T. natalensis*, M. Web., p. 157.

D. XV 12-13; A. III 9-10; Sc. 27-30  $\frac{2\frac{1}{2}-3}{13-14}$ ;

mouth  $\frac{3}{4}$  width of head, extending to between nostril and eye; caudal truncate . . .

8. *T. linnelli*, Lönnb., p. 159.

\*\*\* Caudal peduncle deeper than long; 2 or 3 series of scales on the cheek; 15-25 gill-rakers; pectoral often much longer than head in adult.

D. XV-XVI 12-13; A. III 9-10; Sc. 29-

$31 \frac{3-3\frac{1}{2}}{13-15}$ ; caudal truncate or slightly emarginate . . .

9. *T. macrochir*, Blgr., p. 160.

D. XV-XVIII 11-15; A. III 8-11; Sc. 31-

$35 \frac{3\frac{1}{2}-5}{13-18}$ ; caudal rounded in the adult . . .

10. *T. nilotica*, L., p. 162.

$\beta$ . Outer teeth with extremely slender shafts, sometimes almost setiform; 2 or 3 series of scales on the cheek; caudal truncate or slightly emarginate.

\* Caudal peduncle not deeper than long.

D. XVI-XVII 10-13; A. III 9-10; Sc. 31-

$32 \frac{3\frac{1}{2}-4}{13-15}$ ; third anal spine longer than longest dorsal; 20-30 gill-rakers . . .

11. *T. eduardiana*, Blgr., p. 166.

D. XVI-XVIII 10-13; A. III (IV) 10-11;

Sc. 31-35  $\frac{3\frac{1}{2}-5}{14-16}$ ; third anal spine not longer than longest dorsal; 17-19 gill-rakers . . .

12. *T. variabilis*, Blgr., p. 167.

\*\* Caudal peduncle deeper than long.

† 18-27 gill-rakers; Sc. 29-34  $\frac{3-4\frac{1}{2}}{10-16}$ .

D. XV-XVII 12-14; A. III 10-12; Sc. 30-

34  $\frac{3\frac{1}{2}-4\frac{1}{2}}{14-16}$ ; mouth extending to below

nostril, or slightly beyond. . . . . 13. *T. galilea*, Art., p. 169.

D. XV-XVII 11-13; A. III 9-11; Sc. 29-

33  $\frac{3-3\frac{1}{2}}{12-16}$ ; mouth extending to between

nostril and eye . . . . . 14. *T. andersonii*, Cast., p. 171.

†† 15-21 gill-rakers; Sc. 27-31  $\frac{2-3}{11-13}$ .

D. XIV-XVII 11-13; A. III 8-11; Sc. 27-

30  $\frac{2\frac{1}{2}-3}{12-13}$ ; 15-19 gill-rakers; depth of

body 2 to  $2\frac{1}{4}$  times in total length, much

greater than length of head . . . . . 15. *T. heudeloti*, A. Dum., p. 173.

D. XIV-XVI 12-13; A. III 9-11; Sc. 28-

31  $\frac{2\frac{1}{2}-3}{11-12}$ ; 18-21 gill-rakers; depth of

body  $2\frac{1}{4}$  to  $2\frac{1}{2}$  times in total length. . . . . 16. *T. multifasciata*, Gthr., p. 175.

D. XV-XVI 10-12; A. III 7-9; Sc. 27-

30  $\frac{2-3}{11-13}$ ; 15-18 gill-rakers; depth of

body  $2\frac{1}{5}$  to  $2\frac{1}{2}$  times in total length. . . . . 17. *T. macrocephala*, Blkr., p. 176.

γ. Outer teeth rather large (44 to 60 in upper jaw); 3 or 4 series of scales on the cheek; 16-18 gill-rakers; caudal rounded.

D. XVI 13; A. III 10; Sc. 33  $\frac{3\frac{1}{2}}{12}$ ; pectoral a

little longer than head . . . . . 18. *T. ngomensis*, Pellegr., p. 178.

D. XVI 12-13; A. III 9-10; Sc. 30-31  $\frac{3\frac{1}{2}}{12}$ ;

pectoral not longer than head . . . . . 19. *T. haugi*, Pellegr., p. 178.

δ. Caudal densely scaled; 15-22 gill-rakers.

D. XVII-XVIII 11; A. III 10; Sc. 33-

35  $\frac{4}{12-13}$ ; 3 or 4 series of scales on the

cheek; caudal peduncle longer than deep; [p. 180.

caudal emarginate . . . . . 20. *T. auromarginata*, Blgr.,

D. XVI 10-12; A. III 8-9; Sc. 29-32  $\frac{3-3\frac{1}{2}}{12-13}$ ;

2 or 3 series of scales on the cheek; teeth

extremely slender; caudal peduncle deeper

than long; caudal rounded . . . . . 21. *T. lepidura*, Blgr., p. 181.

D. XVI 12; A. III 10; Sc. 29  $\frac{3\frac{1}{2}}{12}$ ; 2 series of

scales on the cheek; caudal peduncle

deeper than long; caudal emarginate,

pointed above, rounded beneath . . . . . 22. *T. boulengeri*, Pellegr., p. 182.

D. XVI 10-11; A. III 8-9; Sc. 32-36  $\frac{3\frac{1}{2}}{14-16}$ ;

2 series of scales on the cheek; caudal peduncle longer than deep; caudal rounded, with a feeble median notch, or upper angle pointed . . . . . 23. *T. squamipinnis*, Gthr., p. 183.

B. Gill-rakers 7 to 15 on lower part of anterior arch.

1. Outer teeth with extremely slender shafts, almost setiform; 12-15 gill-rakers.

a. 15 to 17 dorsal spines; pectoral at least as long as head, reaching or nearly reaching vertical of origin of anal.

D. XV-XVII 9-11; A. III 8-9; Sc. 27-

31  $\frac{2\frac{1}{2}-3}{11-13}$ ; 2 (rarely 3) series of scales on the cheek; caudal truncate or feebly emarginate. . . . . 24. *T. dolloi*, Blgr., p. 184.

D. XV-XVI 12-13; A. III 10-11; Sc. 29-

31  $\frac{3-3\frac{1}{2}}{11-12}$ ; 3 or 4 series of scales on the cheek; caudal rounded . . . . . 25. *T. mariae*, Blgr., p. 186.

b. 12 or 13 dorsal spines; pectoral much shorter than head, not reaching vertical of origin of anal; 3 series of scales on the cheek.

D. XII-XIII 10-12; A. III 9-10; Sc. 30-

32  $\frac{5-6}{19-20}$ ; caudal peduncle longer than deep . . . . . 26. *T. manyara*, Hilg., p. 187.

D. XIII 11; A. III 10; Sc. 30  $\frac{6}{20}$ ; caudal

peduncle as long as deep . . . . . 27. *T. amphimelas*, Hilg., p. 188.

D. XIII 11; A. III 11; Sc. 28-30  $\frac{2\frac{1}{2}}{12}$ ; caudal

peduncle as long as deep . . . . . 28. *T. alcalica*, Hilg., p. 188.

2. Outer teeth moderately slender, or rather large.

a. 2 to 4 series of scales on the cheek.

α. 15 or 16 dorsal spines (rarely 14 or 17); 8 to 11 (rarely 7) soft anal rays; 3 or 4 series of scales on the cheek; caudal peduncle as long as deep or deeper than long.

\* Depth of body not more than twice (or, rarely, slightly more) in total length; pectoral as long as head or a little shorter, or longer.

D. XIV 13; A. III 10; Sc. 27-28  $\frac{3}{12}$ ; 13-14

gill-rakers on lower part of anterior arch;

pectoral much longer than head, extending

a good deal beyond origin of anal . . . 29. *T. dubia*, Lönnb., p. 189.

- D. XV-XVI 10-14; A. III 9-11; Sc. 29-  
 $32 \frac{2\frac{1}{2}-3\frac{1}{2}}{11-14}$ ; 8-12 gill-rakers on lower part  
of anterior arch; caudal truncate or feebly  
emarginate. . . . . [p. 190.  
. . . . . 30. *T. melanopleura*, A. Dum.,
- D. XV 14; A. III 10-11; Sc.  $30 \frac{3\frac{1}{2}}{11}$ ; 14 gill-  
rakers; caudal rounded . . . . . 31. *T. meeki*, Pellegr., p. 194.
- D. XIV-XVII 12-13; A. III 10-11; Sc. 28-  
 $31 \frac{3\frac{1}{2}}{11-13}$ ; 12-15 gill-rakers; caudal  
rounded. . . . . 32. *T. cabrer*, Blgr., p. 194.
- \*\* Depth of body  $2\frac{1}{6}$  to  $2\frac{3}{4}$  times in total length.  
† Pectoral shorter than head ( $\frac{3}{4}$  to  $\frac{4}{5}$ ); 13-15 gill-rakers on lower  
part of anterior arch.
- D. XVI-XVII 12; A. III 8-9; Sc. 30-  
 $32 \frac{2\frac{3}{4}-3\frac{1}{2}}{11-12}$ ; caudal truncate . . . . . 33. *T. brevimanus*, Blgr., p. 196.
- †† Pectoral as long as head, or a little longer or a little shorter;  
8-12 gill-rakers.  
‡ Caudal not scaly.
- D. XIV-XVI 10-13; A. III 7-10; Sc. 28-  
 $33 \frac{3-3\frac{1}{2}}{11-15}$ ; caudal truncate or rounded . . . 34. *T. zillii*, Gerv., p. 197.
- D. XV-XVI 11-12; A. III 8; Sc. 26-  
 $29 \frac{2\frac{1}{2}}{10-11}$ ; caudal truncate. . . . . 35. *T. kottæ*, Lönnb., p. 200.
- D. XV-XVI 11-13; A. III 9; Sc. 30-  
 $31 \frac{3}{10-11}$ ; caudal feebly emarginate, outer  
rays somewhat produced . . . . . 36. *T. guineensis*, Blkr., p. 201.
- †† Caudal scaly nearly all over, rounded.
- D. XV-XVI 8-10; A. III 8-9; Sc. 30-  
 $32 \frac{3}{11-12}$ ; caudal peduncle as long as deep  
or a little deeper than long . . . . . 37. *T. tholloni*, Sauv., p. 202.
- D. XVI-XVII 12-13; A. III 9-10; Sc. 30-  
 $31 \frac{3-3\frac{1}{2}}{11-12}$ ; caudal peduncle much deeper  
than long . . . . . 38. *T. christyi*, Blgr., p. 204.
- β. 17 or 18 dorsal spines; third anal spine a little longer than longest  
dorsal; 7 soft anal rays; 3 or 4 series of scales on the cheek;  
pectoral shorter than head; 10-11 gill-rakers on lower part of  
anterior arch; caudal rounded, feebly emarginate, covered with  
scales.
- D. XVII-XVIII 9-10; A. III 7; Sc. 30-  
 $32 \frac{2\frac{1}{2}}{10}$ ; depth of body  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times in  
total length . . . . . 39. *T. bilineata*, Pellegr., p. 204.



D. XVII 9; A. III 7; Sc.  $29 \frac{2\frac{1}{2}}{10}$ ; depth of body twice in total length . . . . . 40. *T. crassa*, Pellegr., p. 205.

γ. 11 to 15 dorsal spines; 8 to 11 soft anal rays; caudal rounded or rounded-subtruncate.

\* Breast and belly scaly.

D. XIII-XV 9-11 (very rarely 12); A. III 9-10; Sc.  $27-29 \frac{2\frac{1}{2}-3\frac{1}{2}}{9-10}$ ; 9-12 gill-rakers on lower part of anterior arch; 2 or 3 series of scales on the cheek; depth of body 2 to  $2\frac{3}{5}$  times in total length . . . . . 41. *T. sparrmani*, A. Smith, [p. 206.

D. XIII-XV 9-11; A. III 8-9; Sc.  $27-30 \frac{2\frac{1}{2}-3}{10}$ ; 7-9 gill-rakers; 3 or 4 series of scales on the cheek; depth of body  $2\frac{2}{3}$  to 3 times in total length . . . . . 42. *T. ovalis*, Sldr., p. 208.

D. XIV-XV 12-13; A. III 8-9; Sc.  $31-33 \frac{3\frac{1}{2}-4}{11}$ ; 12-14 gill-rakers; 4 series of scales on the cheek; depth of body  $2\frac{1}{2}$  to 3 times in total length . . . . . 43. *T. steindachneri*, Blgr., p. 209.

D. XIII-XV 11; A. III (IV) 9-10; Sc.  $30-31 \frac{3-3\frac{1}{2}}{12}$ ; 13-14 gill-rakers; 2 series of scales on the cheek; depth of body  $2\frac{1}{2}$  times in total length . . . . . 44. *T. percivali*, Blgr., p. 210.

\*\* Breast and belly naked.

D. XI 11-12; A. III 8-9; Sc.  $28-30 \frac{3}{11}$ ; 10-11 gill-rakers; 3 series of scales on the cheek; depth of body  $3-3\frac{1}{3}$  times in total length . . . . . 45. *T. grahamsi*, Blgr., p. 211.

b. 5 to 7 series of scales on the cheek.

D. XV 13; A. III 9; Sc.  $34 \frac{3\frac{1}{2}}{10}$ ; 12 gill-rakers on lower part of anterior arch; depth of body  $2\frac{3}{4}$  times in total length; caudal rounded . . . . . 46. *T. woosnami*, Blgr., p. 212.

D. XV 10; A. III 8; Sc.  $33 \frac{3}{8}$ ; 9 gill-rakers; depth of body  $3\frac{1}{2}$  times in total length; caudal truncate . . . . . 47. *T. jallae*, Blgr., p. 213.

D. XV 10; A. III 8; Sc.  $30 \frac{5}{12}$ ; depth of body  $3\frac{3}{5}$  times in total length; caudal rounded . . . . . 48. *T. humilis*, Sldr., p. 213.

D. XIV-XV 14-16 ; A. III 10-11 ; Sc. 29-

$32 \frac{3\frac{1}{2}-4\frac{1}{2}}{11-12}$  ; 11-12 gill-rakers ; depth of

body 2 to  $2\frac{1}{4}$  times in total length ; caudal

rounded, scaly all over in the adult. . . 49. *T. buettikoferi*, Hubr., p. 214.

II. Scales with more or less distinctly denticulate edge.

A. Caudal rounded or truncate, not at all emarginate.

1. Dorsal with 14 or 15 spines ; eye 3 to 4 times in length of head ; depth of body  $2\frac{1}{3}$  to 3 times in total length ; caudal rounded or rounded-subtruncate.

a. Caudal peduncle not or but little longer than deep.

$\alpha$ . 3 to 5 series of scales on the cheek.

\* Pectoral shorter than head.

D. XIV-XV 10-11 ; A. III 6-7 ; Sc. 29-

$30 \frac{3-4}{12}$  ; caudal densely scaled at the base. 50. *T. fasciata*, Perugia, p. 215.

D. XIV-XV 9-11 ; A. III 8-9 ; Sc. 28-

$31 \frac{3-3\frac{1}{2}}{11}$  ; mouth to below anterior border

of eye or a little beyond ; teeth in 4 to 6

series, 50-70 in outer series of upper jaw. 51. *T. burtoni*, Gthr., p. 217.

D. XIV-XV 10-11 ; A. III 8-9 ; Sc. 30-

$32 \frac{3\frac{1}{2}-4}{11}$  ; lower jaw slightly projecting ;

mouth not extending to below anterior

border of eye ; teeth in 2 series, about 50

in outer series of upper jaw . . . . . 52. *T. acuticeps*, Stdr., p. 218.

D. XV 9-10 ; A. III 8-9 ; Sc. 29-31  $\frac{2\frac{1}{2}-3}{10-11}$  ;

mouth extending to below anterior border

of eye ; teeth in 4 series, 40-42 in outer

series of upper jaw . . . . . 53. *T. swynnertoni*, Blgr., p. 219.

\*\* Pectoral as long as head.

[p. 220.]

D. XIV 10 ; A. III 9 ; Sc. 31  $\frac{3\frac{1}{2}}{11}$  . . . . . 54. *T. adolphi-frederici*, Blgr.,

$\beta$ . 6 series of scales on the cheek.

D. XV 14 ; A. III 9 ; Sc. 34  $\frac{4\frac{1}{2}}{12}$  . . . . . 55. *T. giardi*, Pellegr., p. 221.

b. Caudal peduncle much longer than deep.

[p. 222.]

D. XIV-XV 8-9 ; A. III 8 ; Sc. 28  $\frac{4}{13}$  . . . 56. *T. fuellebornii*, Hilg. & Papp.,

2. Dorsal with 15 to 17 spines (rarely 14) ; eye 4 to  $4\frac{1}{2}$  times in length of head in adult ; depth of body  $2\frac{2}{3}$  to  $3\frac{1}{3}$  times in total length.

a. 7-10 gill-rakers on lower part of anterior arch ; caudal rounded.

D. XIV-XVI 8-10 ; A. III 7-8 ; Sc. 30-

$33 \frac{3-4}{11-12}$  ; teeth in 3 to 5 series ; snout

shorter than postocular part of head . . 57. *T. calliptera*, Gthr., p. 222.

- D. XVI 9-10; A. III 8-9; Sc. 32-33  $\frac{3\frac{1}{2}}{11}$ ;  
teeth in 3 series; snout as long as post-ocular part of head . . . . . 58. *T. lucullæ*, Blgr., p. 224.
- D. XVII 8; A. III 7; Sc. 31  $\frac{5}{13}$ ; teeth in 5  
or 6 series; caudal densely scaled in basal  
half . . . . . 59. *T. williamsii*, Gthr., p. 225.
- D. XV-XVI 8-10; A. III 7; Sc. 27-29  $\frac{2-3}{10-11}$ ;  
teeth in 3 or 4 series . . . . . 60. *T. stigmatogenys*, Blgr., p. 226.  
b. 12-13 gill-rakers; teeth in 4 to 7 series.
- D. XVI-XVII 9; A. III 7; Sc. 30-31  $\frac{2\frac{1}{2}-3}{16-17}$ ;  
caudal rounded . . . . . 61. *T. stormsii*, Blgr., p. 227.
- D. XV-XVI 8-10; A. III 6-8; Sc. 29-  
33  $\frac{3-5}{11-12}$ ; caudal truncate or rounded-  
subtruncate . . . . . 62. *T. horii*, Gthr., p. 228.
3. Dorsal with 15 to 17 spines; eye  $2\frac{2}{3}$  to  $3\frac{2}{3}$  times in length of head.  
a. Depth of body 3 to  $3\frac{3}{4}$  times in total length; teeth in 3 to 5 series;  
caudal peduncle  $1\frac{1}{3}$  to  $1\frac{3}{4}$  times as long as deep.  
α. 7-9 gill-rakers on lower part of anterior arch; caudal rounded or  
rounded-subtruncate.
- D. XV-XVI 9; A. III 8; Sc. 32-33  $\frac{5}{12}$ ; head  
with straight upper profile; lower jaw  
projecting; dorsal spines subequal from  
the sixth or seventh . . . . . 63. *T. perrieri*, Pellegr., p. 229.
- D. XV-XVI 9-10; A. III 8-10; Sc. 32-  
33  $\frac{4}{10}$ ; head with curved upper profile,  
 $2\frac{1}{3}$  to  $2\frac{1}{2}$  times as long as broad; dorsal  
spines increasing in length to the last . . 64. *T. humilior*, Blgr., p. 230.
- D. XV-XVI 8-10; A. III 8-9; Sc. 30-  
33  $\frac{4-5}{11-12}$ ; head with curved upper profile,  
2 to  $2\frac{1}{4}$  times as long as broad; dorsal  
spines subequal from the fifth or sixth . . 65. *T. pallida*, Blgr., p. 231.  
β. 10-12 gill-rakers; caudal truncate.
- D. XV-XVI 8-9; A. III 7-8; Sc. 31-  
34  $\frac{4-4\frac{1}{2}}{12-13}$  . . . . . 66. *T. pappenheimi*, Blgr., p. 232.  
b. Depth of body  $2\frac{1}{2}$  to 3 times in total length.  
α. Teeth in 3 to 5 series.
- D. XV-XVI 8-9; A. III 8-9; Sc. 30-  
34  $\frac{4-5}{12-13}$ ; 7-9 gill-rakers; eye  $3\frac{1}{3}$  to  $3\frac{1}{2}$   
times in length of head; caudal truncate. 67. *T. lacrimosa*, Blgr., p. 234.

- D. XV-XVI 8-10 ; A. III 8-10 ; Sc. 29-33  $\frac{3-4}{11-12}$  ; 8-9 gill-rakers ; eye 3 to  $3\frac{1}{2}$  times in length of head ; caudal rounded . 68. *T. nubila*, Blgr., p. 235.
- D. XV-XVI 8-9 ; A. III 8 ; Sc. 30  $\frac{4}{10}$  ; 10 gill-rakers ; eye somewhat more than 3 times in length of head ; pectoral nearly as long as head, reaching origin of anal . . . . . 69. *T. pectoralis*, Pfeff, p. 237.
- D. XV-XVI 9-10 ; A. III 9 ; Sc. 32-33  $\frac{4}{10-11}$  ; 10-12 gill-rakers ; eye 3 times in length of head ; caudal truncate ; pectoral shorter than head . . . . . 70. *T. macrops*, Blgr., p. 238.
- D. XV-XVI 8-10 ; A. III 8-9 ; 8-9 gill-rakers ; eye  $2\frac{2}{3}$  to 3 times in length of head ; caudal truncate . . . . . 71. *T. martini*, Blgr., p. 239.
- β. Teeth in 5 to 8 series.
- D. XV-XVI 6-10 ; A. III 9-10 ; eye 3 times in length of head ; mouth extending to below eye ; caudal rounded-subtruncate . 72. *T. hayoni*, Blgr., p. 240.
- D. XV-XVI 9-10 ; A. III 9-10 ; eye  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times in length of head ; mouth not extending to below eye ; caudal truncate . 73. *T. nigricans*, Blgr., p. 241.
- D. XV-XVI 9-10 ; A. III 8-9 ; eye  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times in length of head ; mouth extending to below anterior border of eye ; 60-80 teeth in outer series of upper jaw ; caudal rounded . . . . . 74. *T. simotes*, Blgr., p. 242.
- D. XVII 9 ; A. III 8 ; eye  $3\frac{1}{2}$  times in length of head ; mouth extending to below anterior border of eye ; 40 teeth in outer series of upper jaw ; caudal rounded . . . . . 75. *T. livingstonii*, Blgr., p. 243.
4. Dorsal with 18 or 19 spines ; teeth in 4 to 6 series.
- a. Caudal densely scaled, at least at the base ; third anal spine not longer than longest dorsal.
- D. XVIII 8 ; A. III 8 ; Sc. 31  $\frac{6-7}{16}$  ; depth of body  $2\frac{3}{4}$  times in total length ; 5 or 6 series of scales on the cheek . . . . . 76. *T. zebra*, Blgr., p. 244.
- D. XIX 6 ; A. III 6 ; Sc. 34  $\frac{5-6}{12}$  ; depth of body  $3\frac{2}{3}$  times in total length ; 3 series of scales on the cheek . . . . . 77. *T. aurata*, Blgr., p. 246



b. Caudal not scaled ; third anal spine a little longer than longest dorsal.

D. XVIII-XIX 8-9 ; A. III 7-8 ; Sc. 32-

34  $\frac{3}{15}$  . . . . . 78. *T. polyacanthus*, Blgr., p. 247.

B. Caudal more or less distinctly notched ; eye 3 to  $4\frac{1}{2}$  times in length of head ; third anal spine not longer than longest dorsal.

1. 8-13 gill-rakers on lower part of anterior arch ; 31-35 scales in longitudinal series.

a. Caudal rays not scaly.

D. XV-XVIII 11-12 ; A. III 8-10 ; Sc. 32-

35  $\frac{3\frac{1}{2}-4}{11-12}$  ; 30-40 teeth in outer series of upper jaw ; depth of body  $2\frac{1}{2}$  to 3 times in total length . . . . . 79. *T. pleurotaenia*, Blgr., p. 247.

D. XV-XVI 10-11 ; A. III 8-9 ; Sc. 32-

33  $\frac{3-4}{11-13}$  ; 40-50 teeth in outer series of upper jaw ; depth of body  $2\frac{3}{4}$  to  $3\frac{1}{4}$  times in total length. . . . . 80. *T. johnstonii*, Gthr., p. 249.

D. XIV-XV 10-11 ; A. III 8-9 ; Sc. 31-

32  $\frac{3}{12}$  ; 56-60 teeth in outer series of upper jaw ; depth of body  $2\frac{2}{3}$  to  $2\frac{3}{4}$  times in total length . . . . . 81. *T. tetrastigma*, Gthr., p. 250.

b. Caudal rays covered with scales, except at the end.

D. XV-XVII 9-11 ; A. III 8-10 ; Sc. 33-

35  $\frac{3\frac{1}{2}-4\frac{1}{2}}{11-12}$  ; 30 (young)-60 teeth in outer series of upper jaw . . . . . 82. *T. kirkii*, Gthr., p. 251.

D. XV-XVI 10-12 ; A. III 8-10 ; Sc. 32-

33  $\frac{3-3\frac{1}{2}}{11-13}$  ; 40 (young)-70 teeth in outer series of upper jaw . . . . . 83. *T. lateristriga*, Gthr., p. 253.

D. XV-XVI 10-11 ; A. III 8-9 ; Sc. 33-

35  $\frac{3-4}{10-11}$  ; about 80 teeth in outer series of upper jaw . . . . . 84. *T. lethrinus*, Gthr., p. 254.

2. 12-21 gill-rakers ; 34-37 scales in longitudinal series ; pectoral not reaching vertical of origin of anal.

D. XV-XVI 11 ; A. III 9 ; Sc. 34-35  $\frac{4-5}{14}$  ;

16-21 gill-rakers ; snout much longer than broad . . . . . 85. *T. rostrata*, Blgr., p. 255.

D. XVIII-XX 9-11 ; A. III 8-9 ; Sc. 35-

38  $\frac{4-5}{10-11}$  ; 12-14 gill-rakers ; snout not longer than broad . . . . . 86. *T. dardennii*, Blgr., p. 256.

C. Caudal emarginate; third anal spine longer than longest dorsal.

D. XIII-XIV 10-13; A. III 7-9; Sc. 32-

$34 \frac{3\frac{1}{2}-4\frac{1}{2}}{12-16}$ ; last dorsal spine not more than

$2\frac{1}{2}$  times in length of head. . . . . 87. *T. oligacanthus*, Blkr., p. 258.

D. XIII-XV 12-14; A. III 10-12; Sc. 33-

$36 \frac{4-4\frac{1}{2}}{14-16}$ ; last dorsal spine  $2\frac{1}{2}$  to 3 times

in length of head. . . . . 88. *T. betsileana*, Blgr., p. 259.

D. Caudal deeply notched, often suberescentic; eye not more than 3 times in length of head.

1. 31-34 scales in longitudinal series; 8-12 gill-rakers on lower part of anterior arch.

D. XV-XVII 10-11; A. III 8-9; Sc. 32-

$34 \frac{3}{12}$ ; eye  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times in length of [p. 261.

head; caudal peduncle longer than deep . 89. *T. macrophthalmia*, Blgr.,

D. XV 12; A. III 9; Sc. 31-32  $\frac{3}{12}$ ; eye  $2\frac{1}{2}$

times in length of head; caudal peduncle

as long as deep . . . . . 90. *T. brevis*, Blgr., p. 262.

2. 34-65 scales in longitudinal series; 13-17 gill-rakers.

D. XVI-XVII 11-12; A. III 9; Sc. 34-

$36 \frac{3\frac{1}{2}-4}{11-12}$ ; eye  $2\frac{2}{3}$  to 3 times in length of

head; caudal peduncle  $1\frac{2}{3}$  times as long

as deep . . . . . 91. *T. inornata*, Blgr., p. 263.

D. XVI 11; A. III 9; Sc. 40  $\frac{3}{10}$ ; eye 3 times

in length of head; caudal peduncle  $1\frac{1}{2}$

times as long as deep . . . . . 92. *T. trematocephala*, Blgr., p. 264.

D. XII-XIII 14; A. III 8-9; Sc. 39-

$40 \frac{5}{14-15}$ ; eye  $2\frac{1}{2}$  times in length of head;

caudal peduncle nearly twice as long as

deep . . . . . 93. *T. boops*, Blgr., p. 265.

D. XIII-XIV 13-14; A. III 9-10; Sc. 55-

$65 \frac{5-6}{18-25}$ ; eye  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times in length

of head; caudal peduncle a little longer

than deep . . . . . 94. *T. grandoculis*, Blgr., p. 266.

### 1. TILAPIA HUNTERI.

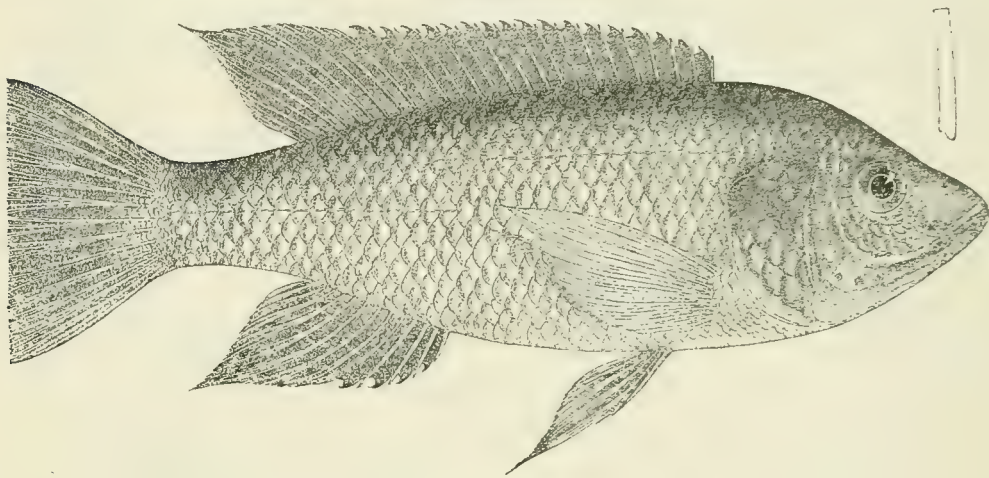
*Oreochromis hunteri*, Günth. Proc. Zool. Soc. 1889, p. 70; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 354.

*Tilapia hunteri*, Bouleng. Proc. Zool. Soc. 1899, p. 110.

Depth of body equal to length of head,  $3\frac{1}{5}$  times in total length.

Head nearly twice as long as broad ; snout rounded, with concave upper profile, slightly broader than long, about  $\frac{3}{4}$  postocular part of head ; eye 5 times in length of head ( $3\frac{1}{2}$  times in young), twice (once in young) in interorbital width, equal to præorbital depth ; mouth rather large, nearly  $\frac{3}{4}$  width of head, extending to between nostril and eye ; teeth in 5 to 8 series (3 in young), 46 (young) to 90 in outer series of upper jaw \* ; 3 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, 19 to 21 on lower part of anterior arch. Dorsal XVI–XVII 11–12 ; last spine longest,  $\frac{1}{3}$  length of head ; longest soft ray  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Anal IV 10–11 ; fourth spine longest, a little shorter than last dorsal. Pectoral as long as or

Fig. 97†.

*Tilapia hunteri.*Type.  $\frac{2}{5}$ .

a little shorter than head, reaching or nearly reaching vertical of origin of anal. Ventral reaching vent. Caudal truncate. Caudal peduncle a little longer than deep. Scales cycloid, 34–36  $\frac{5}{14-15}$  ; lateral lines  $\frac{18-19}{15-16}$ . Dark brown, tinged with rusty ; vertical fins and ventrals blackish.

Total length 300 millim.

Kilimanjaro.

- |                              |                              |                                    |
|------------------------------|------------------------------|------------------------------------|
| 1. Type, skin.               | Crater Lake, Kilimanjaro.    | H. C. V. Hunter, Esq. (P.).        |
| 2–4. Yg., and head<br>of ad. | L. Chala, E. of Kilimanjaro. | A. Blayney Percival, Esq.<br>(P.). |

\* Some of the outer teeth conical in the adult.

† In this and several of the following figures, one of the outer teeth of the upper jaw is represented, strongly magnified ; in all the figures the enlargement is the same in proportion to the specimen.

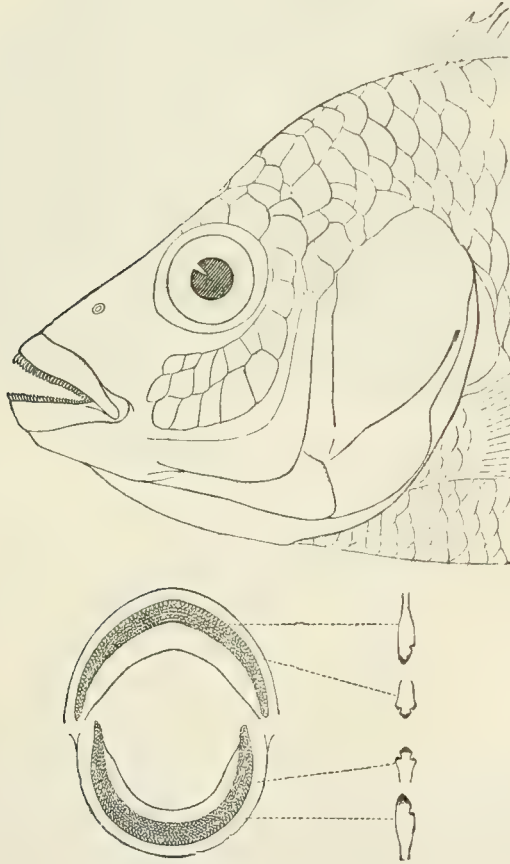
## 2. TILAPIA SHIRANA.

*Oreochromis shiranus*, Bouleng. Proc. Zool. Soc. 1896, p. 916, fig. ; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 355.

*Tilapia shirana*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 4, and Proc. Zool. Soc. 1899, p. 111.

Depth of body 2 to  $2\frac{3}{5}$  times in total length, length of head 3 times. Head  $1\frac{2}{3}$  to  $1\frac{4}{5}$  times as long as broad ; snout rounded, with straight or

Fig. 98.

Head of *Tilapia shirana*.

Type (P. Z. S. 1896).

slightly concave upper profile, a little broader than long,  $\frac{3}{4}$  to  $\frac{4}{5}$  post-ocular part of head ; eye 4 to 5 times in length of head,  $1\frac{2}{3}$  to 2 times in interorbital width, equal to or a little less than præorbital depth ; mouth moderate,  $\frac{2}{5}$  to  $\frac{2}{3}$  width of head, extending to between nostril and eye ; teeth in 5 to 8 series, 70 to 100 in outer series of upper jaw ; 2 or 3 series of scales on the cheek, width of scaly part not greater than



diameter of eye. Gill-rakers short, 15 to 19 on lower part of anterior arch. Dorsal XVI-XVII 10-13; last spine longest, about  $\frac{1}{2}$  length of head; longest soft rays  $\frac{2}{3}$  to nearly once length of head. Anal IV 9-10; fourth spine longest, about  $\frac{2}{3}$  length of head. Pectoral as long as or slightly longer than head, reaching vertical of origin of anal, or not quite so far. Ventral reaching vent or anal. Caudal truncate. Caudal peduncle as long as deep or a little deeper than long. Scales cycloid, 30-32  $\frac{3-3\frac{1}{2}}{13-14}$ ; lateral lines  $\frac{18-22}{11-16}$ . Uniform dark brown.

Total length 270 millim.

Lake Nyassa and Upper Shiré; Lower Zambesi.

1-4. Type.	Upper Shiré.	Dr. Percy Rendall (C.) ; Sir H. H. Johnston (P.).
5-6. Ad.	L. Nyassa.	Prof. J. E. S. Moore (C.).
7. Skel.	"	"
8. Ad.	Idunda R., Lower Buzi R., Portuguese East Africa.	C. F. M. Swynnerton, Esq. (P.).

### 3. TILAPIA NIGRA.

*Oreochromis niger*, Günth. Proc. Zool. Soc. 1894, p. 89, pl. ix. ; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 355.

*Tilapia nigra*, Bouleng. Proc. Zool. Soc. 1899, p. 110.

Depth of body  $2\frac{1}{4}$  to  $2\frac{1}{3}$  times in total length, length of head 3 to  $3\frac{1}{3}$  times. Head  $1\frac{2}{3}$  to  $1\frac{3}{4}$  times as long as broad; snout rounded, with straight upper profile, broader than long.  $\frac{2}{3}$  to  $\frac{3}{4}$  postocular part of head; eye 5 to  $5\frac{1}{2}$  times in length of head, 2 to  $2\frac{1}{4}$  times in interorbital width, equal to or a little less than præorbital depth; mouth rather large,  $\frac{2}{3}$  to  $\frac{3}{4}$  width of head, extending nearly to below anterior border of eye; teeth in 4 or 5 series, 80-100 in outer series of upper jaw\*; 2 or 3 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 17 on lower part of anterior arch. Dorsal XVII 11-12; last spine longest, and quite  $\frac{1}{2}$  length of head; middle soft rays much produced, longer than head. Anal IV 9; fourth spine longest, nearly as long as last dorsal. Pectoral as long as head, extending to vertical of origin of anal. Ventral reaching anal. Caudal truncate or slightly emarginate. Caudal peduncle deeper than long. Scales

\* The outer teeth are mostly conical or indistinctly bicuspid in the larger specimen.

cycloid,  $32 \frac{3-4}{14}$ ; lateral lines  $\frac{19-20}{15-17}$ . Greenish black; a black opercular spot; fins blackish, soft dorsal and caudal with more or less distinct round light spots between the rays.

Total length 250 millim.

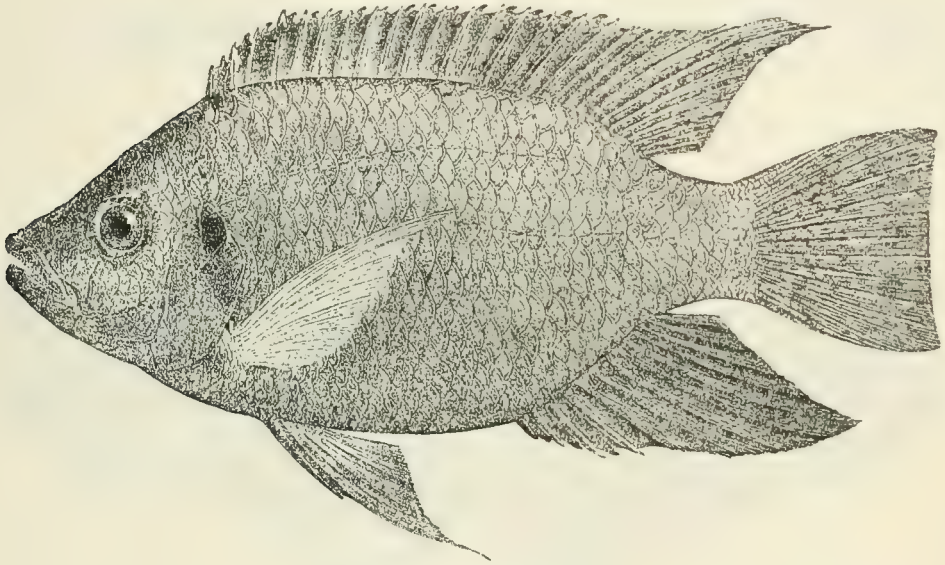
Athi River System, British East Africa.

1-2. Types.

Pools on Kibwesi R.

Prof. J. W. Gregory (P.).

Fig. 99.



*Tilapia nigra*.

Type, after Günther (*l. c.*).  $\frac{1}{2}$ .

#### 4. TILAPIA KAFUENSIS.

Bouleng. Ann. & Mag. N. H. (8) x. 1912, p. 138.

Depth of body  $2\frac{1}{4}$  times in total length, length of head 3 times. Head  $1\frac{2}{3}$  times as long as broad; snout rounded, with straight upper profile, slightly broader than long, a little shorter than postocular part of head; eye  $5\frac{1}{2}$  times in length of head,  $\frac{2}{5}$  interorbital width, a little less than præorbital depth; mouth rather large,  $\frac{4}{5}$  width of head, extending to between nostril and eye; teeth in 8 series, 110 in outer series of upper jaw; 4 series of scales on the cheek, width of scaly part a little greater than diameter of eye. Gill-rakers moderate, 25 on lower part of anterior arch. Dorsal XVII 13; last spine longest,  $\frac{2}{5}$  length of head; longest soft ray  $\frac{2}{3}$  length of head. Anal III 11; third spine not quite  $\frac{1}{3}$  length of head. Pectoral slightly longer than head, reaching

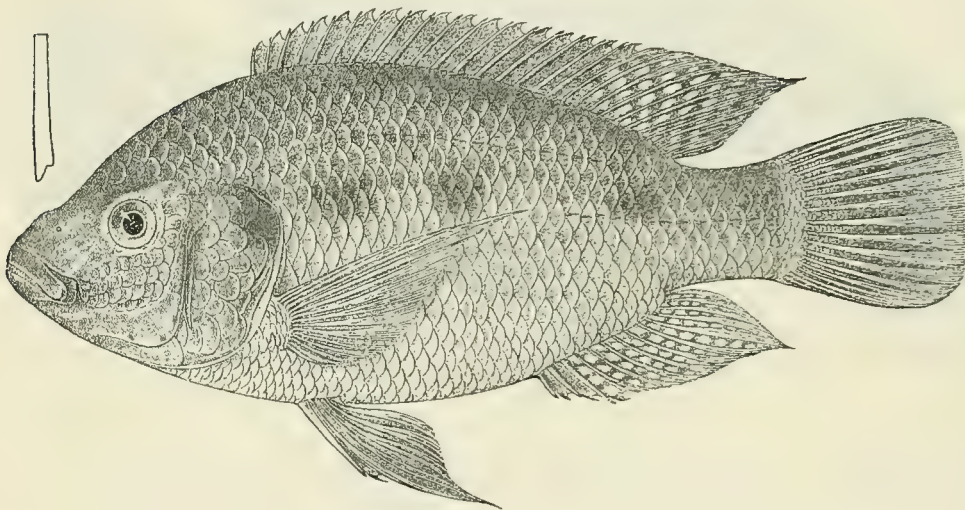
vertical of origin of anal. Ventral reaching between vent and anal. Caudal rounded. Caudal peduncle as long as deep. Scales cycloid,  $33\frac{4\frac{1}{2}}{16}$ ; lateral lines  $\frac{22-23}{1-13}$ . Dark brown above, whitish beneath; a black opercular spot and three ill-defined black spots on the side below upper lateral line; soft dorsal and anal fins with round light spots between the rays.

Total length 360 millim.

Upper Zambesi.

1. Type. Kafue R., N.W. Rhodesia. T. Codrington, Esq. (P.).

Fig. 100.



*Tilapia kafuensis*.

Type.  $\frac{1}{3}$ .

##### 5. TILAPIA MOSSAMBICA.

*Chromis (Tilapia) mossambicus*, Peters, Mon. Berl. Ac. 1852, p. 681.

*Chromis niloticus*, part., Peters, Arch. f. Nat. 1855, p. 267; Günth. Cat. Fish. iv. p. 510 (1862); Peters, Reise Mossamb. iv. p. 23, pl. iv. fig. 4 (1868).

*Chromis mossambicus*, part., Günth. t. c. p. 268.

*Chromis dumerilii*, Steind. Verh. zool.-bot. Ges. Wien, xiv. 1864, p. 225, pl. vii. fig. 1\*.

*Chromis niloticus*, var. *mossambicus*, M. Web. Zool. Jahrb., Syst. x. 1897, p. 148.

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\* I am indebted to Dr. Steindachner for the loan of one of the types of *Chromis dumerilii*, and regard it as a young *T. mossambica*.

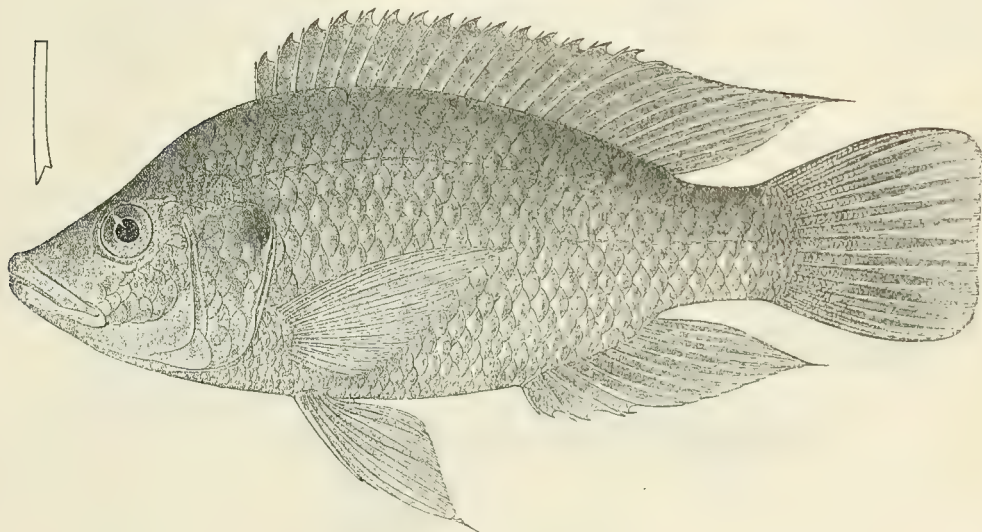


*Tilapia mossambica*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 4, and Proc. Zool. Soc. 1899, p. 111; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 309.

*Tilapia dumerili*, Bouleng. Proc. Zool. Soc. 1899, p. 116; Pellegr. t. c. p. 317.

Depth of body  $2\frac{1}{2}$  to  $2\frac{3}{4}$  times in total length, length of head  $2\frac{2}{3}$  to 3 times. Head  $1\frac{4}{5}$  to 2 times as long as broad, with concave upper profile; snout rounded, as broad as or a little broader than long, as long as or a little shorter than postocular part of head; eye  $4\frac{1}{2}$  (young) to  $6\frac{1}{2}$  times in length of head,  $\frac{2}{5}$  to  $\frac{2}{3}$  interorbital width, equal to or a little less than præorbital depth; mouth large, at least  $\frac{3}{4}$  width of head, often nearly as wide as head, extending to below anterior border of

Fig. 101.



*Tilapia mossambica*.  
Zanzibar Coast.  $\frac{5}{8}$ .

eye, or not quite so far; teeth in 4 (young) to 8 series\*, 60 (young) to 100 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part at least nearly equal to diameter of eye. Gill-rakers short, 17 to 20 on lower part of anterior arch. Dorsal XV–XVI 10–11; last spine longest,  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; longest soft ray  $\frac{3}{5}$  to  $\frac{5}{6}$  length of head. Anal III (rarely IV) 9–10; third spine a little shorter than last dorsal. Pectoral as long as or a little shorter than head, reaching vertical of origin of anal or beyond. Ventral reaching vent or origin of anal. Caudal rounded in the adult, truncate in the young. Caudal peduncle as long as deep or slightly deeper than long. Scales cycloid,

\* In the largest specimen, from Koso Bay, the teeth of the three outer series in both jaws are conical, without a trace of secondary cusp.



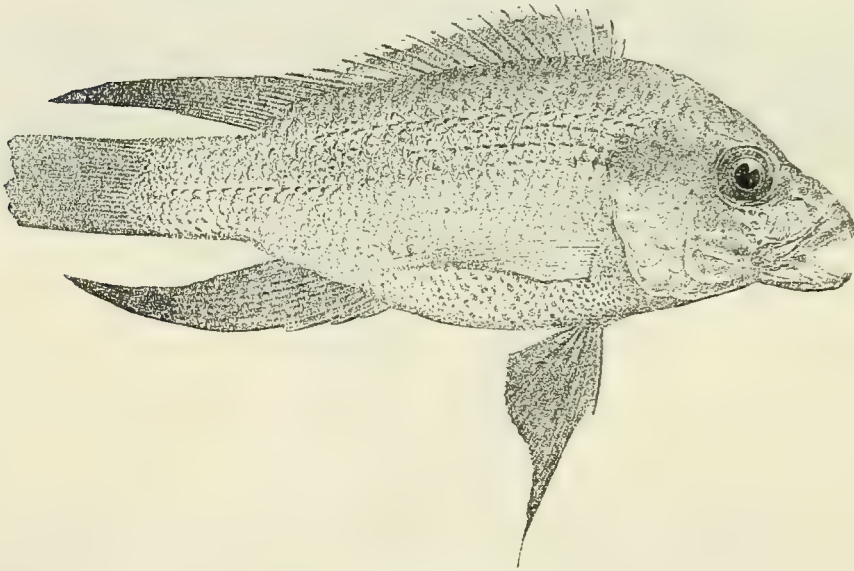
30-33  $\frac{3\frac{1}{2}-4\frac{1}{2}}{12-15}$ ; lateral lines  $\frac{18-21}{10-15}$ . Brownish, olive, or blackish; vertical fins and ventrals blackish; dorsal and caudal edged with yellowish (red?).

Total length 360 millim.

East Africa to Natal. Types in Berlin Museum.

1-2. Ad.	Zanzibar Coast.	Sir J. Kirk (P.).
3-4. Two of the types.	Zambesi.	Prof. W. Peters (P.).
5. Ad.	Upper Shiré R.	Dr. Percy Rendall (C.); Sir H. H. Johnston (P.).
6. Ad.	Koso Bay, Zululand.	Dr. E. Warren (P.).
7. Ad.	Durban.	Mr. T. Ayres (C.).
8. Ad.	„	Rev. N. Abraham (P.).

Fig. 102.



*Tilapia vorax*.

Type, after Pfeffer (Jahrb. Hamb. Wiss. Anst. 1893).  $\frac{3}{4}$ .

#### 6. TILAPIA VORAX.

*Chromis vorax*, Pfeff. Jahrb. Hamb. Wiss. Anst. x. 1893, p. 151, pl. ii. figs. 9-11, and Thierw. O.-Afr., Fische, p. 12, fig. (1896).

*Tilapia vorax*, Bouleng. Proc. Zool. Soc. 1899, p. 125; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 322.

Depth of body nearly equal to length of head,  $2\frac{1}{4}$  to  $2\frac{3}{4}$  times in total length. Head twice as long as broad; snout with straight upper profile.

a little shorter than postocular part of head, slightly broader than long,  $1\frac{1}{2}$  to  $1\frac{2}{3}$  diameters of eye, which is 4 to 5 times in length of head and  $1\frac{1}{2}$  to nearly twice in interorbital width; mouth large, extending to below anterior border of eye or a little beyond; teeth very small, in 3 or 4 series, about 60 in outer series of upper jaw; 2 or 3 series of scales on the cheek. Gill-rakers short, 17 on lower part of anterior arch. Dorsal XV–XVI 12–13; last spine about  $\frac{1}{3}$  length of head; middle soft rays much produced, as long as head. Anal III 10; third spine a little shorter than last dorsal. Pectoral as long as head, extending a little beyond origin of anal. Ventral extending beyond origin of anal. Caudal truncate. Caudal peduncle as long as deep. Scales cycloid, 28–31  $\frac{3\frac{1}{2}}{12}$ ; lateral lines  $\frac{21}{13-15}$ . Dark olive-brown; a rather indistinct dark opercular spot; vertical fins and ventrals blackish.

Total length 149 millim.

German East Africa and Mozambique.—Type, in Hamburg Museum, examined.

#### 7. TILAPIA NATALENSIS.

*Chromis niloticus*, part., Peters, Arch. f. Nat. 1855, p. 267, and Reise Mossamb. iv. p. 23 (1868); Pfeff. Jahrb. Hamb. Wiss. Anst. x. 1893, p. 149, pl. iii. figs. 1–4, and Thierw. O.-Afr., Fische, p. 10, fig. (1896).

*Chromis mossambicus*, part., Günth. Cat. Fish. iv. p. 268 (1862).

*Chromis natalensis*, M. Web. Zool. Jahrb., Syst. x. 1897, p. 147.

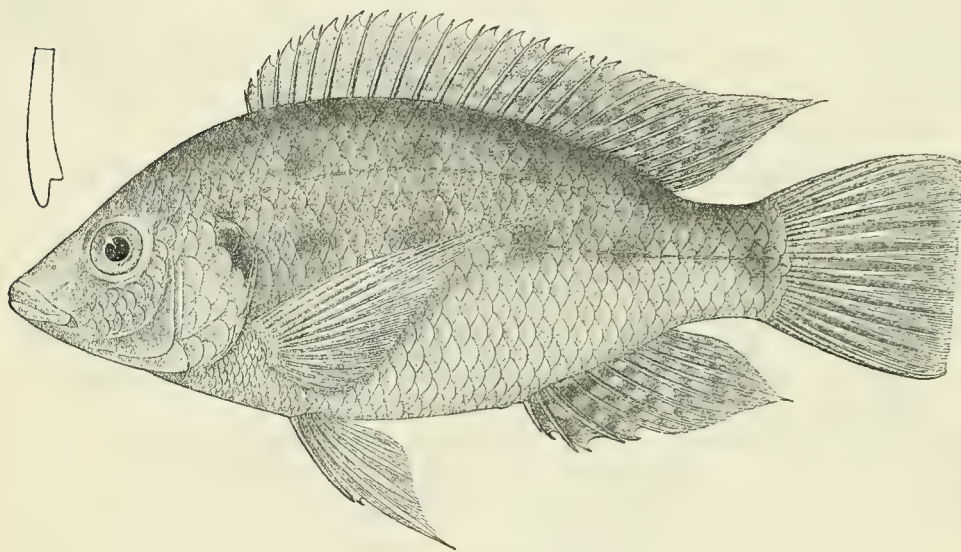
*Tilapia natalensis*, Bouleng. Proc. Zool. Soc. 1899, p. 113, and Poiss. Bass. Congo, p. 457 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 311.

Depth of body  $2\frac{1}{5}$  to  $2\frac{2}{3}$  times in total length, length of head  $2\frac{4}{5}$  to  $3\frac{1}{4}$  times. Head  $1\frac{2}{3}$  to 2 times as long as broad; snout rounded, with straight or convex upper profile, as broad as or a little broader than long,  $\frac{2}{3}$  to  $\frac{4}{5}$  postocular part of head; eye 3 (young) to  $5\frac{1}{2}$  times in length of head, 1 (young) to 2 times in interorbital width, equal to or a little less than præorbital depth; mouth moderate,  $\frac{3}{5}$  to  $\frac{3}{4}$  width of head, extending to between nostril and eye; teeth in 3 (young) to 6 series\*, 50 (young) to 140 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part not greater than diameter of eye. Gill-rakers short, 15 to 20 on lower part of anterior arch. Dorsal XV–XVI (rarely XVII or XVIII) 10–12; last spine longest,  $\frac{2}{5}$  to a little over  $\frac{1}{2}$  length of head; longest soft rays  $\frac{2}{3}$  to  $\frac{4}{5}$  length of head.

\* In a large specimen, from Umfulosi, a number of the outer upper teeth are simply conical.

Anal III 9-11; third spine a little shorter than last dorsal. Pectoral 1 to  $1\frac{1}{4}$  times as long as head, reaching vertical of origin of anal or beyond. Ventral reaching vent or origin of anal. Caudal truncate or very slightly emarginate, the angles sometimes rounded. Caudal peduncle as long as deep, or slightly deeper than long. Scales cycloid, 30-34  $\frac{3\frac{1}{2}-4\frac{1}{2}}{13-17}$ ; lateral lines  $\frac{17-22}{11-17}$ . Brown above, whitish beneath; a blackish opercular spot, sometimes followed by series of similar spots along the side of the body above and below the upper lateral line;

Fig. 103.

*Tilapia natalensis.*Durban.  $\frac{5}{8}$ .

young with 7 or 8 more or less distinct dark vertical bars often in addition to the two series of blackish spots; vertical fins uniform or with small round blackish spots or light spots separated by a dark network.

Total length 330 millim.

East and South Africa, Katanga.—Types in Amsterdam University.

1. Yg.	Webi Shebeli.	Dr. Donaldson Smith (C.).
2-3. Hgr.	Taita, inland of Mombasa.	Mr. Wray (C.).
4-11. Ad., hgr., & yg.	Rabai, inland of Mombasa, 500 ft.	S. L. Hinde, Esq. (P.).
12. Hgr.	Coast of Zanzibar.	Sir J. Kirk (P.).
13-17. Hgr. & yg.	Zambesi.	Prof. W. Peters (P.).
18-19. Yg.	Lofoi, Katanga.	Capt. Lemaire (C.)
20-22. Yg.	Moa-Chia, Katanga.	„

23. Hgr.	Beira, Portuguese E. Africa.	Mr. C. Grant (C.); C. D. Rudd, Esq. (P.).
24. Hgr.	Klein Letaba, Transvaal.	"
25. Ad.	Middle Letaba, Transvaal.	Dr. J. D. F. Gilchrist (P.).
26. Hgr.	Inkomati R., near Komati Poort, Transvaal.	Major G. E. Bruce (P.).
27. Ad.	Dewaars R., Transvaal.	Dr. J. D. F. Gilchrist (P.).
28. Ad.	Crocodile R., "	Hon. P. A. Methuen (P.).
29-31. Ad. & yg.	Umfulosi Station, Zululand.	Mr. C. Grant (C.); C. D. Rudd, Esq. (P.).
32. Skel.	" "	"
33. Ad.	Indukuduku, Zululand.	Dr. E. Warren (P.).
34. Ad.	Koso Bay, "	"
35. Yg.	Inkusi R., Natal.	"
36-37, 38-40, 41-42. Ad. & hgr.	Durban.	Mr. T. Ayres (C.).
43-52. Hgr. & yg.	"	Col. Bowker (P.).
53-58. Ad., hgr., & yg.	"	Rev. N. Abraham (C.); Dr. A. Günther (P.).
59-67. Ad., hgr., & yg.	"	Rev. N. Abraham (P.).
68. Hgr.	"	J. F. Quekett, Esq. (P.).
69, 70-71. Ad. & yg.	Buffalo R., East London.	Dr. J. D. F. Gilchrist (P.).

This species is very closely connected with *T. nilotica*, and the naming of some isolated specimens may be somewhat arbitrary.

#### 8. TILAPIA LINNELLII.

*Tilapia* (*Gephyrochromis*) *linnellii*, Lönnb. Ann. & Mag. N. H. (7) xii. 1903, p. 42.

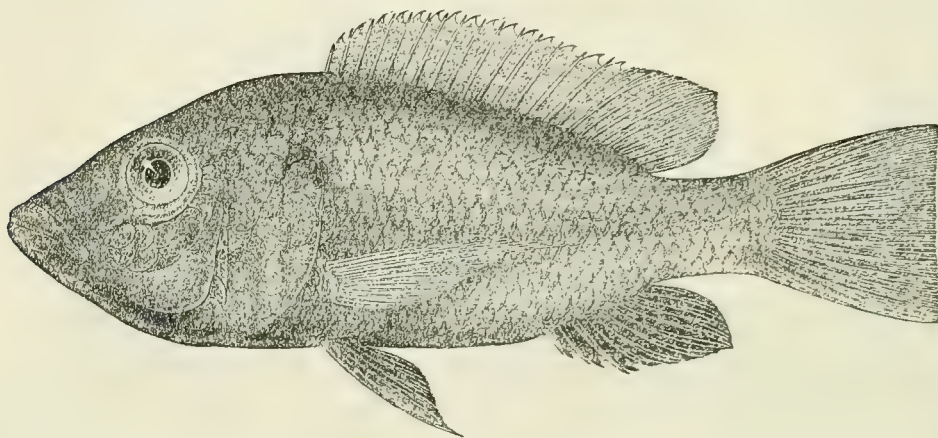
Depth of body  $2\frac{2}{3}$  to  $2\frac{3}{4}$  times in total length, length of head  $2\frac{1}{3}$  to  $2\frac{1}{2}$  times. Head twice, or a little over twice, as long as broad, upper profile nearly straight; snout rounded, as long as postocular part of head; eye 5 times in length of head,  $1\frac{2}{3}$  times in interorbital width, equal to præorbital depth; mouth rather large,  $\frac{3}{4}$  width of head, extending to between nostril and eye; teeth in 6 or 7 series, outer (about 100 in upper jaw) conical\*; 2 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, 16 on lower part of anterior arch. Dorsal XV 12-13; last spine longest, not

\* In view of variations in other species, I doubt whether the conical condition of the outer teeth will prove a constant character, although Prof. Lönnberg has had as many as eight specimens at his disposal.



quite  $\frac{1}{3}$  length of head; longest soft ray about  $\frac{2}{3}$  length of head. Anal III 9-10; third spine a little shorter than longest dorsal. Pectoral  $\frac{5}{6}$  length of head, reaching beyond origin of anal. Ventral not reaching vent. Caudal truncate. Caudal peduncle as long as deep. Scales cycloid, 27-30  $\frac{2\frac{1}{2}-3}{13-14}$ ; lateral lines  $\frac{17-20}{12-13}$ . Brown (formaline specimens);

Fig. 104.

*Tilapia linnelli.*Type.  $\frac{2}{3}$ .

pectoral fins lighter; male with the chin, throat, belly, and ventral and anal fins deep black.

Total length 200 millim.

Elephant Lake, Cameroon.—Type in Stockholm Museum.

- |               |                                  |                         |
|---------------|----------------------------------|-------------------------|
| 1. One of the | Elephant Lake, nr. Cameroon Mt., | Mr. G. Linnell (C.);    |
| types.        | 320 m.                           | Prof. E. Lönnberg (C.). |

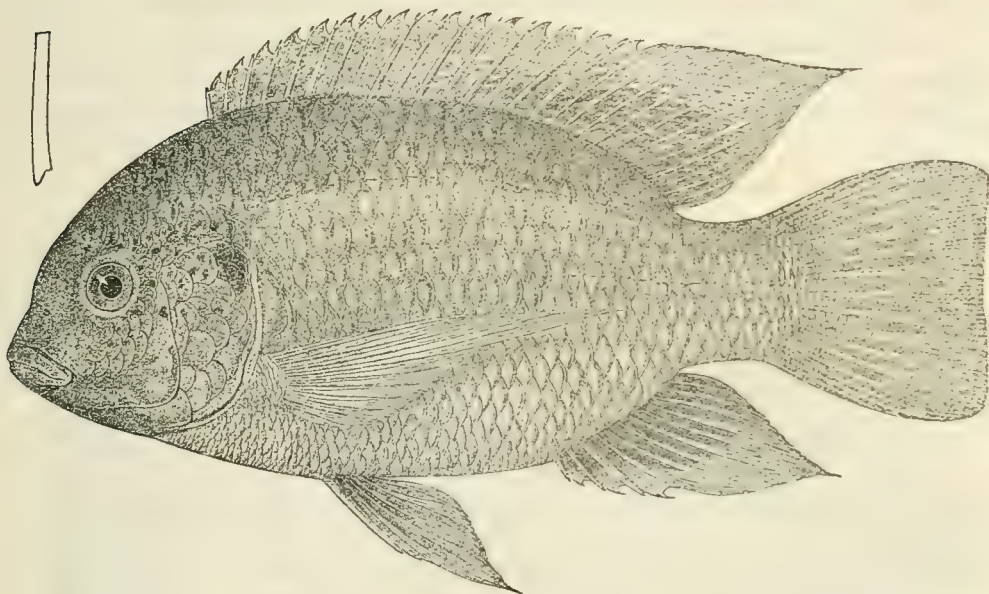
### 9. TILAPIA MACROCHIR.

Bouleng. Ann. & Mag. N. H. (8) x. 1912, p. 139.

Depth of body  $1\frac{3}{4}$  to  $2\frac{1}{5}$  times in total length, length of head 3 times. Head  $1\frac{2}{3}$  to  $1\frac{4}{5}$  times as long as broad; upper profile descending in a strong curve, often very abrupt in front; snout rounded, sometimes with concave upper profile, a little broader than long, shorter than postocular part of head; eye 4 to  $5\frac{1}{2}$  times in length of head,  $\frac{2}{5}$  to  $\frac{3}{5}$  interorbital width, equal to or a little less than præorbital depth; mouth rather small,  $\frac{1}{2}$  to  $\frac{3}{5}$  width of head, extending to between nostril and eye; teeth in 5 to 8 series, 70 to 100 in outer series of upper jaw; 2 or 3

series of scales on the cheek, width of scaly part not greater than diameter of eye. Gill-rakers moderate, 21 to 25 on lower part of anterior arch. Dorsal XV-XVI 12-13; last spine longest,  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head; longest soft ray  $\frac{3}{4}$  to 1 length of head. Anal III 9-10;

Fig. 105.



*Tilapia macrochir.*  
Type, Victoria Falls.  $\frac{1}{3}$ .

third spine  $\frac{1}{3}$  to  $\frac{1}{2}$  length of head. Pectoral  $1\frac{1}{4}$  to  $1\frac{1}{2}$  times length of head, reaching beyond vertical of origin of anal. Ventral reaching vent or anal. Caudal truncate or slightly emarginate. Caudal peduncle deeper than long. Scales cycloid, 29-31  $\frac{3-3\frac{1}{2}}{13-15}$ ; lateral lines  $\frac{19-22}{11-14}$ . Olive-brown above, golden-yellow beneath, sometimes with rather indistinct darker longitudinal streaks following the series of scales; a blackish opercular spot; head usually with small brown or blackish spots, as often also on anterior part of body; young with 7 to 10 narrower vertical dark bars; dorsal fin with more or less distinct dark and light longitudinal streaks.

Total length 340 millim.

Upper Zambesi; Lakes Bangwelu and Mweru.

1-2. Types.	Above Victoria Falls.	T. Codrington, Esq. (P.).
3-12. „	Marambu R., 2 miles N. of	„
	Victoria Falls.	

- 13-15, 16-19. Types. L. Bangwelu. F. H. Melland, Esq. (P.).  
 20. Yg. L. Mweru. Capt. Lemaire (C.).  
 21. Yg. Hot springs near Kafue R., J. M. Mowbray, Esq. (P.).  
 N.W. Rhodesia.

## 10. TILAPIA NILOTICA.

*Labrus niloticus*, Linn. in Hasselq. Iter Palæ-t. p. 346 (1757), and S. N. i. p. 477 (1766); Sonnini, Voy. Egypte, ii. p. 395, pl. xxvii. fig. 1 (1799).

*Chromis nilotica*, Cuv. in Guér. Icon. R. An. i. Poiss. pl. xlv. fig. 1 (1844); Sauv. Bull. Soc. Philom. (7) iv. 1880, p. 211; Lortet, Ann. Mus. Lyon, iii. 1883, p. 137, pl. vii.; Mitch. Rep. Fish. L. Menzaleh, p. 12, pl. ii. (1895); Günth. Proc. Zool. Soc. 1896, p. 218.

*Chromis niloticus*, part., Günth. Cat. Fish. iv. p. 267 (1862), and Proc. Zool. Soc. 1864, p. 490; Steind. Verh. zool.-bot. Ges. Wien, xiv. 1864, p. 226; Peters, Reise Mossamb. iv. p. 23 (1868); Günth. Petherick's Trav. ii. p. 216 (1869); Steind. Sitzb. Ak. Wien, lx. i. 1870, p. 96; Pfeff. Jahrb. Hamb. Wiss. Anst. x. 1893, p. 149; Vincig. Ann. Mus. Genova, (2) xv. 1895, p. 28; Pfeff. Thierw. O.-Afr., Fische, p. 10 (1896).

*Chromis guentheri*, Steind. Verh. zool.-bot. Ges. Wien, xiv. 1864, p. 228, pl. viii. figs. 3 & 4.

*Chromis spilurus*, Günth. Proc. Zool. Soc. 1894, p. 89, pl. x. fig. A, and 1896, p. 219.

*Tilapia nilotica*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 6, Proc. Zool. Soc. 1899, p. 112, and Poiss. Bass. Congo, p. 455 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 309; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 571, and Fish. Nile, p. 523, pls. xciii. & xciv. (1907).

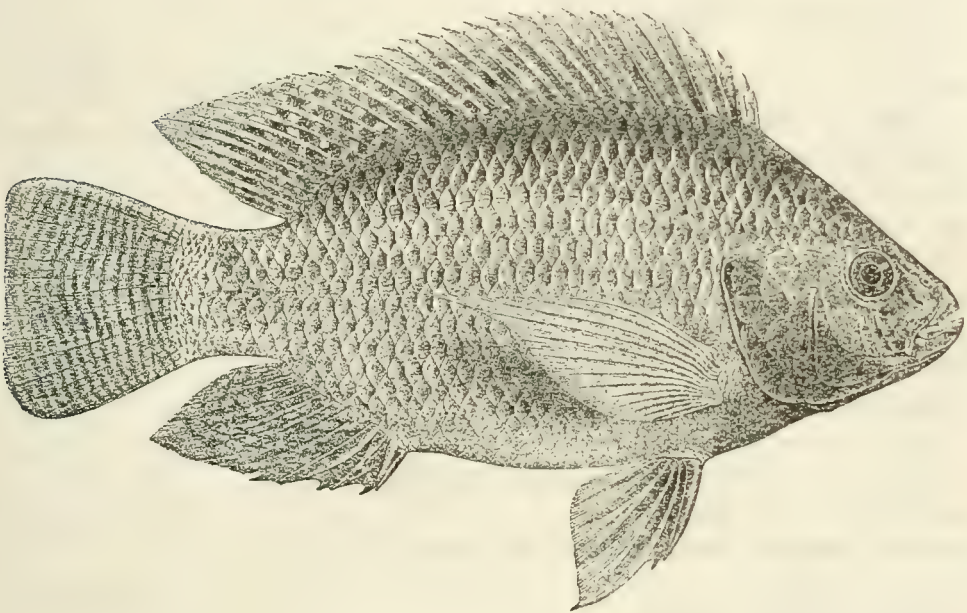
*Tilapia nyirica*, Lönnb. Svensk. Vet.-Ak. Handl. xlvii. no. 6, 1911, p. 41.

Depth of body 2 to  $2\frac{3}{5}$  times in total length, length of head  $2\frac{3}{5}$  to  $3\frac{1}{4}$  times. Head  $1\frac{2}{3}$  to 2 times as long as broad; snout rounded, with straight or slightly convex upper profile, 1 to  $1\frac{1}{2}$  times as broad as long,  $\frac{1}{2}$  to  $\frac{2}{3}$  postocular part of head; eye  $3\frac{1}{2}$  (young) to  $5\frac{2}{3}$  times in length of head, 1 (young) to  $2\frac{1}{2}$  times in interorbital width, equal to or less than præorbital depth; mouth moderately large,  $\frac{1}{2}$  to  $\frac{2}{3}$  width of head, extending to below anterior border of eye or to between nostril and eye; teeth in 2 (young) to 7 series, 30 (young) to 90 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part not exceeding diameter of eye. Gill-rakers short, 17 to 25 (rarely as few as 15) on lower part of anterior arch. Dorsal XVI-XVII (rarely XV or XVIII) 11-15; spines subequal from the fifth, or last longest,  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{2}{3}$  to once length of head. Anal III 8-11; third spine as long as or shorter or a little longer than longest



dorsal. Pectoral 1 to  $1\frac{1}{3}$  times as long as head, reaching vertical of origin of anal or beyond (shorter in the young). Ventral reaching vent or anal. Caudal truncate in the young, rounded in the adult. Caudal peduncle deeper than long. Scales cycloid, 31-35  $\frac{3\frac{1}{2}-5}{13-18}$ ; lateral lines  $\frac{19-25}{11-18}$ . Yellowish brown or grey to dark olive, or silvery, the scales often darker at the base, or lighter in the centre; some specimens spotted all over with black; young with 8 or 9 more or less distinct dark bars on the body and a dark spot just below the upper border of the caudal peduncle; these markings may persist in the adult; a blackish

Fig. 106.



*Tilapia nilotica.*  
Cairo (F. N.).  $\frac{3}{8}$ .

opercular spot; dorsal and anal fins with blackish and whitish spots forming oblique series, or with oblique dark streaks; caudal fin with more or less distinct bars, variable in number.

Total length 460 millim.

From Lake Galilee and the Jordan southwards to East Africa, the Upper Congo, and Lake Tanganyika, westwards through the Chad Basin to the Senegal and Niger.

1-2. Ad. L. Galilee.  
3-12. Ad. & hgr. L. Mareotis.

Canon Tristram (C.).  
L. Loat, Esq. (C.).



13-19. Ad. & hgr.	L. Edkou.	L. Loat, Esq. (C.).
20-24. Ad.	L. Borollos, fresh-water canal.	"
25-26. Hgr.	L. Menzaleh.	Dr. J. C. Mitchell (P.).
27-32. Ad. & hgr.	"	L. Loat, Esq. (C.).
33, 34-38. Yg.	Ghet-el-Nassara, near L. Menzaleh.	"
39-42. Hgr. & yg.	Bahr-el-Tawilah, near L. Menzaleh.	"
43. Skel.	Nile.	Dr. Rüppell (C.).
44-48. Ad.	Lower Nile.	J. Petherick, Esq. (C.).
49. Skel.	"	"
50-59, 60-109. Ad. & yg.	Damietta Nile, nr. Samannud.	L. Loat, Esq. (C.).
110-114, 115. Ad. & yg.	Barrage near Cairo.	"
116. Ad.	Cairo.	Dr. J. C. Mitchell (P.).
117-120, 121-122. Ad., hgr., & yg.	Near Cairo.	L. Loat, Esq. (C.).
123-124. Yg.	Canal near Cairo.	"
125. Ad.	Pond nr. Bedreshen, S. of Cairo.	"
126. Ad.	Zoological Gardens, Giza.	"
127-136. Ad., hgr., & yg.	Beni Souef.	"
137. Ad.	Bahr Selah, Fayum.	"
138-147. Ad. & hgr.	Birket Karun, Fayum.	"
148. Ad.	Between Assiut and Abu Tig.	"
149. Ad.	Luxor.	"
150-157. Hgr. & yg.	Between Luxor and Assuan.	"
158-163. Ad., hgr., & yg.	Assuan.	"
164-165. Hgr.	Ibrim, Nubia.	"
166. Ad.	Abu Simbel, Nubia.	"
167-171. Ad. & yg.	Kosheh, "	"
172. Ad.	Is. of Arko, "	"
173. Ad.	Hannak, "	"
174. Yg.	Wad Medine, Blue Nile.	Capt. S. Flower (P.).
175. Yg.	Rosaires, "	"
176. Ad.	Abu Zugoli, "	L. Loat, Esq. (C.).
177-182. Ad.	Zegi and Bahardar, L. Tsana.	Mr. E. Degen (C.).
183-184. Hgr. & yg.	Between Khartum and Sobat R.	Mr. P. C. Zaphiro (C.); W. N. McMillan, Esq. (P.).

185. Hgr.	Kaka, White Nile.	L. Loat, Esq. (C.).
186-195, 196-199. Ad., hgr., & yg.	Gharb-el-Aish, White Nile.	"
200-206. Ad. & hgr.	Fashoda, White Nile.	"
207-210. Ad. & hgr.	Polkom, Baro R. (Sobat).	Mr. P. C. Zaphiro (C.) ; W. N. McMillan, Esq. (P.).
211. Ad.	Gabt-el-Magahir, between Sobat R. and Bahr-el-Zeraf.	Capt. S. Flower (P.).
212. Ad.	Mouth of L. No.	L. Loat, Esq. (C.).
213-218. Yg.	L. No.	"
219-222, 223-232. Ad., hgr., & yg.	Gondokoro.	"
233. Ad.	Wadelai.	J. S. Budgett, Esq. (P.).
234-235. Ad.	Butyaba, L. Albert.	"
236. Ad.	" "	Paris Museum (E.).
237. Hgr.	L. Albert.	Dr. H. Schubotz (C.) ; German C. African Exped.
238-239. Ad.	L. Albert Edward.	" "
240. Hgr.	"	Scott Elliot, Esq. (P.).
241-242. Ad.	S.W. shore of L. Albert Edward.	Prof. J. E. S. Moore (C.).
243-244. Yg.	Foot of Mt. Ruwenzori, 5000- 6000 ft.	Scott Elliot, Esq. (P.).
245. Ad.	S. end of L. Kivu.	Prof. J. E. S. Moore (C.).
246. Ad.	Lofu, L. Tanganyika.	Dr. W. A. Cunningham (C.).
247-253. Yg.	Uvira, "	Dr. L. Stappers (C.).
254-255. Ad.	Quole, Hawash R.	Mr. E. Degen (C.).
256-257. Hgr.	Hot springs of Hawash R., near Filon.	Prof. O. Neumann and Baron C. von Erlanger (C.).
258-261. Ad.	L. Zwai.	Mr. P. C. Zaphiro (C.) ; W. N. McMillan, Esq. (P.).
262-263. Yg.	Suksuk R., L. Zwai.	Prof. O. Neumann and Baron C. von Erlanger (C.).
264-267. Ad. & hgr.	L. Suksuki, 3900 f.	Mr. P. C. Zaphiro (C.) ; W. N. McMillan, Esq. (P.).
268-269. Hgr. & yg.	Modjo R. (Webi Shebeli).	Prof. O. Neumann and Baron C. von Erlanger (C.).
270. Ad.	L. Abaia.	Dr. Donaldson Smith (C.).
271. Hgr.	L. Gandjule, S. of L. Abaia.	Prof. O. Neumann (C.).
272-274. Ad.	" "	Mr. P. C. Zaphiro (C.) ; W. N. McMillan, Esq. (C.).
275. Ad.	N.E. of L. Rudolf.	" "
276-277. Ad. & hgr.	Ergino R. (Omo), 3000 f.	" "

- 278-287, 288-292. Eusso Nyiro, flowing in Lorian A. Blayney Percival, Esq.  
Ad., hgr., & yg. Swamp. (P.).
- 293-294. Types of Eusso Nyiro, below Chanler Prof. E. Lönnberg (P.).  
*T. nyirica*. Falls.
- 295-303. Hgr. & yg. Mwangaden R., Brit. E. Africa. Prof. J. W. Gregory (P.).  
Types of *Chr. spilurus*.
- 304-305. Yg. Simba R., trib. of Athi R., A. Blayney Percival, Esq.  
3000 f. (P.).
306. Ad. Pangani R., Brit. E. Africa. Sir L. Playfair (P.).
- 307-316. Yg. Near Tanganiko, coast of Brit. A. Blayney Percival, Esq.  
E. Africa. (P.).
317. Ad. L. Chad. Capt. G. B. Gosling (P.).
- 318-321. Yg. „ Dr. Gaillard (C.);  
Paris Museum (E.).
- 322-331. Ad., hgr., Kaëdi, Senegal. M. P. Delhez (C.).  
& yg.
- 332-333. Ad. & Niger. W. A. Forbes, Esq. (P.).  
hgr.
334. Ad. Mureji, Upper Niger. J. S. Budgett, Esq. (P.).
335. Yg. Jebba, „ „ C. H. Firmin, Esq. (P.).
- 336-337. Yg. Deert, mouth of Gurara R., J. J. Simpson, Esq. (P.).  
Niger.
- 338-340. Yg. Abo, Lower Niger. Dr. W. J. Ansorge (C.).
- 341-343. Hgr. & Luapula R. at Kasenge. Dr. Stappers (C.).  
yg.
344. Hgr. L. Mweru at Lukonzolwa. „

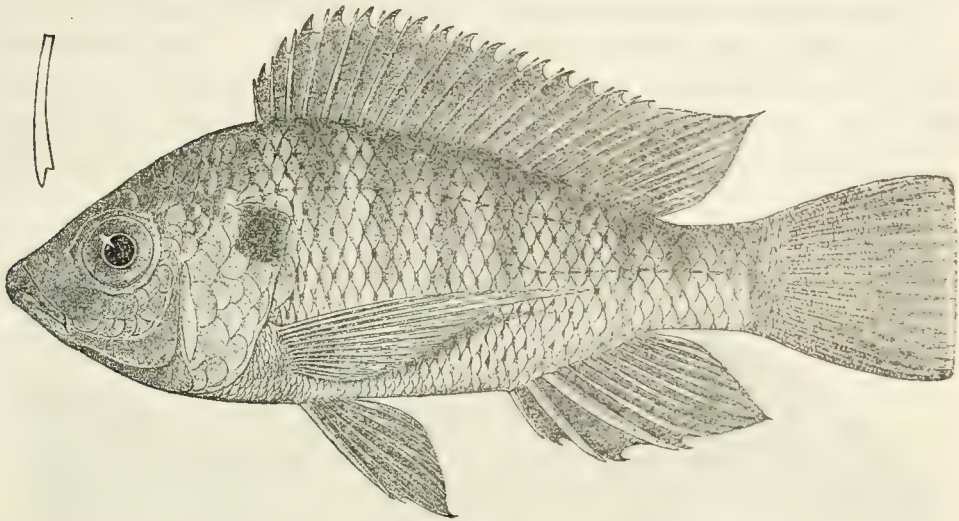
## 11. TILAPIA EDUARDIANA.

Bouleng. Ann. & Mag. N. H. (8) x. 1912, p. 138.

Depth of body equal to length of head,  $2\frac{1}{2}$  to  $2\frac{3}{4}$  times in total length. Head nearly twice as long as broad; snout rounded, with straight or convex upper profile, much broader than long ( $1\frac{1}{2}$  to  $1\frac{2}{3}$ ),  $\frac{1}{2}$  to  $\frac{3}{5}$  post-ocular part of head; eye 3 (young) to  $3\frac{2}{3}$  times in length of head,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times in interorbital width, much longer than præorbital depth; mouth moderate,  $\frac{3}{5}$  to  $\frac{2}{3}$  width of head, extending to between nostril and eye; teeth in 3 series, 66 to 88 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part  $\frac{1}{2}$  to  $\frac{3}{5}$  diameter of eye. Gill-rakers short, 20 to 23 on lower part of anterior arch (18 in the young). Dorsal XVI-XVII 10-13; spines subequal from the fifth or sixth,  $\frac{2}{3}$  to not quite  $\frac{1}{2}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Anal III 9-10; third spine longer than longest dorsal,  $\frac{1}{2}$  or a

little more than  $\frac{1}{2}$  length of head. Pectoral 1 to  $1\frac{1}{6}$  times as long as head, reaching beyond vertical of origin of anal. Ventral reaching vent or origin of anal. Caudal truncate. Caudal peduncle as long as deep. Scales 31–32  $\frac{3\frac{1}{2}-4}{13-15}$ ; lateral lines  $\frac{20-22}{12-18}$ . Dark brown above, with or without very indistinct darker cross-bars, yellowish beneath; a black opercular spot; fins brown or blackish, uniform or with oblique light

Fig. 107.

*Tilapia eduardiana.*Type.  $\frac{2}{3}$ .

streaks on the soft dorsal; young with a large ocellar spot on the anterior part of the soft dorsal.

Total length 180 millim.

Lake Albert Edward watershed of Mount Ruwenzori and Lake Gangu, west of Lake Victoria.

1–6. Types.	S.E. slope of Mt. Ruwenzori, 3200 ft.	R. B. Woosnam, Esq. (C.); Ruwenzori Expedition.
7. Skel.	„ „	R. B. Woosnam, Esq. (C.); Ruwenzori Expedition.
8–13. Yg.	L. Gangu.	C. M. Woodhouse, Esq. (P.).

## 12. TILAPIA VARIABILIS.

*Chromis niloticus* (non Linn.), Hilgend. Sitzb. Ges. naturf. Fr. Berl. 1888, p. 76.

*Tilapia galilæa* (non Artedi), Pellegr. Mém. Soc. Zool. France, xvii. 1905, p. 183.

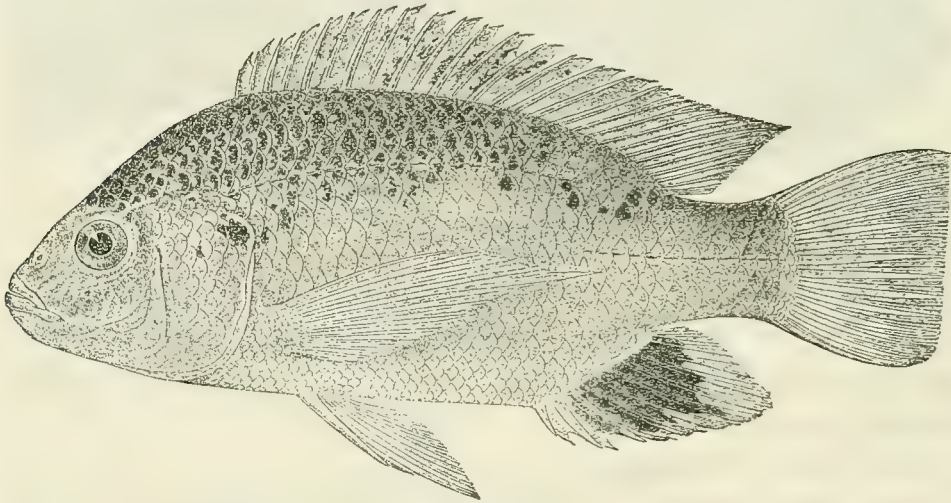
*Tilapia variabilis*, Bouleng. Ann. & Mag. N. H. (7) xvii. 1906, p. 447, Fish. Nile, p. 529, fig. (1907), and Ann. Mus. Genova, (3) v. 1911, p. 76.

Depth of body  $2\frac{1}{5}$  to  $2\frac{1}{2}$  times in total length, length of head  $2\frac{2}{3}$  to 3 times. Head  $1\frac{2}{3}$  to 2 times as long as broad; snout rounded, with



convex upper profile, much broader than long ( $1\frac{1}{2}$  to  $1\frac{2}{3}$ ),  $\frac{1}{2}$  to  $\frac{2}{3}$  post-ocular part of head; eye  $3\frac{1}{2}$  (young) to  $6\frac{1}{2}$  times in length of head,  $1\frac{1}{2}$  (young) to 3 times in interorbital width, equal to or a little less than preorbital depth; mouth rather small,  $\frac{1}{2}$  to  $\frac{2}{3}$  width of head, extending to between nostril and eye; teeth in 4 to 8 series, 50 (young) to 120 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part not greater than diameter of eye. Gill-rakers moderate, 17 to 19 on lower part of anterior arch. Dorsal XVI–XVII (rarely XVIII) 10–13; spines subequal from the fifth, or last longest,  $\frac{1}{2}$  or a little less than  $\frac{1}{2}$  length of head; longest soft rays  $\frac{2}{3}$  to  $\frac{2}{3}$  length of head. Anal III (rarely IV) 10–11; third spine  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Pectoral  $1\frac{1}{6}$  to  $1\frac{1}{4}$  times as long as head, reaching vertical of origin of anal or

Fig. 108.

*Tilapia variabilis.*Type (F. N.).  $\frac{1}{2}$ .

beyond. Ventral reaching vent, or not quite so far, rarely origin of anal. Caudal truncate, more or less obliquely in the adult, lower angle rounded. Caudal peduncle as long as deep or a little longer than deep. Scales cycloid, 31–35  $\frac{3\frac{1}{2}-5}{14-16}$ ; lateral lines  $\frac{19-22}{11-16}$ . Coloration very variable: uniform olive-brown above, or brilliant vermilion on the sides, or bright yellow with black markings; dorsal and caudal fins sometimes edged with red. Young with or without dark cross-bands on the body and oblique dark bands on the soft part of the dorsal fin, and with a blackish ocellar spot on the anterior part of the soft dorsal fin.

Total length 320 millim.

Lake Victoria and Victoria Nile.

1-2, 3-12, 13-25.	Entebbe, L. Victoria.	Mr. E. Degen (C.).
Types.		
26-27. Types.	Lake near Entebbe.	"
28-29. Ad.	" "	C. C. Gowdey, Esq. (P.).
30. Skel.	Entebbe.	"
31-32. Types.	Bunjako, L. Victoria.	Mr. E. Degen (C.).
33, 34-36. Types.	Buganga, "	"
37. Ad.	Jinja, Ripon Falls.	Dr. E. Bayon (C.); Genoa Museum (P.).
38. Ad.	Victoria Nile, between L. Kioge and Murchison Falls.	Dr. E. Bayon (C.); Genoa Museum (P.).
39. Yg.	L. Gangu, W. of L. Victoria.	C. M. Woodhouse, Esq. (P.).

## 13. TILAPIA GALILÆA.

*Sparus galilæus*, Artedi, in Hasselq. Iter Palæst. p. 343 (1757).

*Tilapia pleuromelas*, A. Dum. Arch. Mus. x. 1859, p. 253.

*Tilapia lateralis*, A. Dum. l. c.

*Tilapia macrocentra*, A. Dum. t. c. p. 256.

*Chromis* ? *galilæus*, Günth. Cat. Fish. iv. p. 273 (1862).

*Chromis niloticus*, part., Günth. t. c. p. 267, Proc. Zool. Soc. 1864, p. 490, and Petherick's Trav. ii. p. 216 (1869); Steind. Sitzb. Ak. Wien, lx. i. 1870, p. 964, pl. iv. fig. 1.

*Chromis pleuromelas*, Günth. Cat. p. 271.

*Chromis lateralis*, Günth. t. c. p. 272.

*Chromis niloticus*, Steind. Verh. zool.-bot. Ges. Wien, xiv. 1864, p. 226; Tristram, Faun. Palest. pl. xviii. fig. 1 (1884).

*Chromis tiberiadis*, Lortet, Ann. Mus. Lyon, iii. 1883, p. 135, pl. vi.

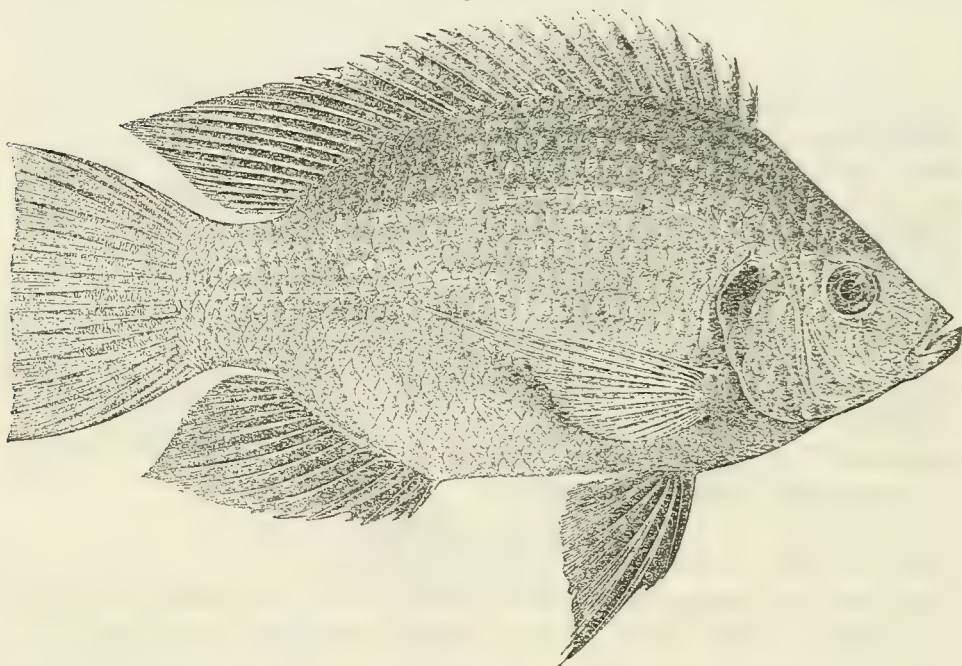
*Chromis microstomus*, Lortet, t. c. p. 139, pl. viii. fig. 1.

*Tilapia galilæa*, Bouleng. Proc. Zool. Soc. 1899, p. 114; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 311; Bouleng. Fish. Nile, p. 531, pl. xev. (1907).

Depth of body  $1\frac{5}{6}$  to  $2\frac{1}{2}$  times in total length, length of head  $2\frac{2}{3}$  to 3 times. Head  $1\frac{2}{3}$  to 2 times as long as broad; snout rounded, with straight or convex upper profile, as broad as or a little broader than long,  $\frac{1}{2}$  to  $\frac{3}{4}$  postocular part of head; eye 3 (young) to 6 times in length of head, 1 (young) to  $2\frac{1}{2}$  times in interorbital width, less than præorbital depth in adult; mouth small, not more than  $\frac{1}{2}$  width of head, extending to below nostril, or slightly beyond; teeth in 3 (young) to 10 series, 40 (young) to 120 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part not exceeding diameter of eye. Gill-rakers short, 18 to 25 on lower part of anterior arch. Dorsal XVI-XVII (rarely XV) 12-14; spines very strong, last longest,  $\frac{3}{5}$  to  $\frac{2}{3}$  length

of head; longest soft ray  $\frac{1}{2}$  to once length of head. Anal III 10-12; third spine as long as or a little shorter or a little longer than last dorsal. Pectoral 1 to  $1\frac{1}{2}$  times as long as head, extending to vertical of origin of anal, or beyond. Ventral reaching vent or anal. Caudal truncate or feebly emarginate. Caudal peduncle deeper than long. Scales cycloid, 30-34  $\frac{3\frac{1}{2}-4\frac{1}{2}}{14-16}$ ; lateral lines  $\frac{19-22}{11-16}$ . Whitish to brownish or olive-green, uniform or with small dark spots, or with ill-defined darker streaks along the series of scales; a more or less distinct dark opercular spot; vertical fins greyish or brown, without markings in the adult; young with 5 to 9 more or less distinct dark bars on the body, and oblique dark streaks

Fig. 109.



*Tilapia galilæa.*  
Khartum (F. N.).  $\frac{1}{2}$ .

on the dorsal and anal fins; a round blackish spot on the anterior part of the soft dorsal fin in very young specimens.

Total length 420 millim.

Lake Galilee and Jordan; Nile system up to Blue Nile and Bahr-el-Gebel; Senegal, Gambia, Portuguese Guinea, Lagos, Niger.

1-3. Ad.	L. Galilee.	Canon Tristram (C.).
4-7. Yg.	L. Mareotis.	L. Loat, Esq. (C.).
8. Hgr.	Near Ghet-el-Nassara, L.	„
	Menzaleh.	



9. Skel.	Lower Nile.	J. Petherick, Esq. (C.).
10. Hgr.	Near Cairo.	L. Loat, Esq. (C.).
11-12, 13-14. Ad.	Zoological Gardens, Giza.	,,
15. Ad.	Bahr Selah, Fayum.	,,
16-20. Ad. & hgr.	Birket Karun, ,,	,,
21. Ad.	Khartum.	J. Petherick, Esq. (C.).
22-31. Hgr.	Omdurman.	L. Loat, Esq. (C.).
32. Ad.	Rosaires, Blue Nile.	,,
33. Ad.	Gondokoro.	,,
34-35. Yg.	St. Louis, Senegal.	M. P. Delhez (C.).
36-40. Ad., hgr., & yg.	Kaédi, ,,	,,
41-42. Hgr.	Gambia.	Sir A. Moloney (P.).
43-44. Hgr. & yg.	,,	J. S. Budgett, Esq. (P.).
45. Ad.	Corbal R. at Tchitala, Portug. Guinea.	Dr. W. J. Ansorge (C.).
46. Ad.	Geba R., Portug. Guinea.	,,
47-53. Hgr. & yg.	Ogun R. at Aro, Lagos.	Major G. E. Bruce (P.).
54-55. Yg.	Jebba, Upper Niger.	Dr. C. Christy (P.).
56. Yg.	,,	Capt. G. F. Abadie (P.).
57. Ad.	Mureji, ,,	J. S. Budgett, Esq. (P.).
58-59. Yg.	Deert, mouth of Gurara R., Niger.	J. J. Simpson, Esq. (P.).
60-61. Yg.	Abo, Lower Niger.	Dr. W. J. Ansorge (C.).
62-71. Yg.	Agberi, ,,	,,
72-76. Ad. & hgr.	Niger.	H. O. Forbes, Esq. (P.).
77. Yg.	Benue R., N. of Ibi.	Norton Smith, Esq. (C.).

The following specimen is referred with doubt to this species:—

78. Yg.	Banzville, Ubanghi.	Capt. Royaux (C.).
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#### 14. TILAPIA ANDERSONII.

*Chromys andersonii*, Casteln. Mém. Poiss. Afr. Austr. p. 14 (1861).

*Chromys chapmanii*, Casteln. op. cit. p. 15.

? *Chromys sparmanni* (non A. Smith), Casteln. t. c. p. 12.

*Melanogenes microcephalus* (non Bleek.), Sauv. Bull. Soc. Zool. France, 1884, p. 196, fig.

*Tilapia flavomarginata*, Bouleng. Ann. Mus. Congo, Zool. i. p. 123, pl. xlv. (1899), Poiss. Bass. Congo, p. 458, and Ann. & Mag. N. H. (8) vi. 1910, p. 560; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 313, and Bull. Soc. Philom. (9) ix. 1907, p. 37, fig.

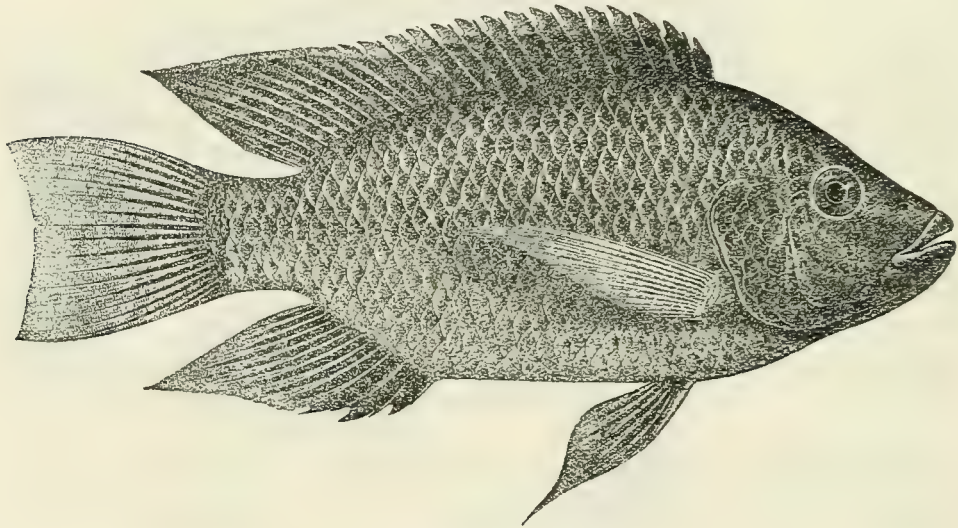
*Tilapia andersonii*, Bouleng. Tr. Zool. Soc. xviii. 1911, p. 415.

Depth of body 2 to  $2\frac{1}{2}$  times in total length, length of head  $2\frac{3}{4}$  to



$3\frac{5}{6}$  times. Head  $1\frac{2}{3}$  to 2 times as long as broad; snout rounded, with straight or convex upper profile, as broad as or a little broader than long, as long as or shorter than postocular part of head; eye 4 to  $5\frac{1}{2}$  times in length of head,  $\frac{4}{9}$  to  $\frac{2}{3}$  interorbital width, equal to or a little less than præorbital depth; mouth moderate,  $\frac{3}{5}$  to  $\frac{3}{4}$  width of head, extending to between nostril and eye; teeth in 4 (young) to 8 series, 60 (young) to 110 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part not greater than diameter of eye. Gill-rakers moderately long, 20 to 25 on lower part of anterior arch. Dorsal XV–XVI (rarely XVII) 11–13; last spine longest,  $\frac{2}{5}$  to a little over  $\frac{1}{2}$  length of head; longest soft rays  $\frac{2}{3}$  to 1 length of head. Anal III 9–11; third spine  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head.

Fig. 110.

*Tilapia andersonii*.

Type of *T. flavomarginata* (A. M. C.).  $\frac{2}{3}$ .

Petcoral 1 to  $1\frac{1}{4}$  times as long as head, reaching vertical of origin of anal, or beyond. Ventral reaching anal or vent, or not quite so far. Caudal truncate or slightly emarginate. Caudal peduncle deeper than long. Scales cycloid, 29–33  $\frac{3-3\frac{1}{2}}{12-16}$ ; lateral lines  $\frac{17-23}{10-16}$ . Dark brown, the scales with lighter centres, or edged with whitish; head sometimes with large black spots; a black opercular spot; vertical fins brownish, purplish, or blackish, usually with round white spots; dorsal and anal edged with yellowish (red in life).

Total length 290 millim.

Lake Ngami district, Angola, Congo, Gaboon.—Type lost.

1-8. Ad.	Okovango R., L. Ngami.	R. B. Woosnam, Esq. (C.).
9. Skel.	" "	" "
10-11. Hgr.	Tala Kilau, Mossamedes.	Dr. W. J. Ansorge (C.).
12-21. Yg.	Dongwenna Swamp, Mossamedes.	" "
22-24. Yg.	Cahaku, Dongwenna, Mossamedes.	" "
25. Yg.	Mucopa R., Mossamedes.	" "
26-30. Ad., hgr., & yg.	Quanza R. at Cunga, Angola.	" "
31-33. Ad.	Quanza R. at Cambambe, "	" "
34-35. Ad.	Bengo R. at Cabiri, "	" "
36-38. Ad.	L. Panguila, Bengo R., "	" "
39. Yg.	Lower Congo.	Brussels Museum (P.).
40-41. Yg.	Boma, Congo.	M. P. Delhez (C.).
42. Yg.	Near Leopoldville, Congo.	Drs. Dutton, Christy, and Todd (P.).
43. One of the types of <i>T. flavo-marginata</i> .	Kalombo Lagoon, Mayombe.	Major Cabra (C.).
44. Ad.	Lucula R., Chiloango R.	Dr. W. J. Ansorge (C.).
45. Ad.	Lebuzi R. at Kuka Muno, Chiloango R.	" "
46. Hgr.	Lebuzi R. at Boma Vonde, Chiloango R.	" "
47. Ad.	Luali R. at Buco Zau, Chiloango R.	" "
48. Ad.	Ngomo, Ogowe.	Rev. E. Haug (C.) ; Paris Museum (E.).

## 15. TILAPIA HEUDELOTI.

A. Dum. Arch. Mus. x. 1859, p. 254 ; Bouleng. Proc. Zool. Soc. 1899, p. 118 ;  
Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 314.

*Tilapia nigripinnis* (Guichen.), A. Dum. l. c. ; Bouleng. t. c. p. 115 ; Pellegr. t. c.  
p. 315.

*Tilapia rangii*, A. Dum. t. c. p. 255 ; Bouleng. t. c. p. 126.

*Chromis heudeloti*, Günth. Cat. Fish. iv. p. 270 (1862).

*Chromis nigripinnis*, Günth. l. c.

*Chromis microcephalus* (Bleek.), Günth. t. c. p. 272.

*Melanogenes microcephalus*, Bleek. Nat. Verh. Vet. Haarlem, xviii. 1863, no. 2,  
p. 37, pl. vi. fig. 1.

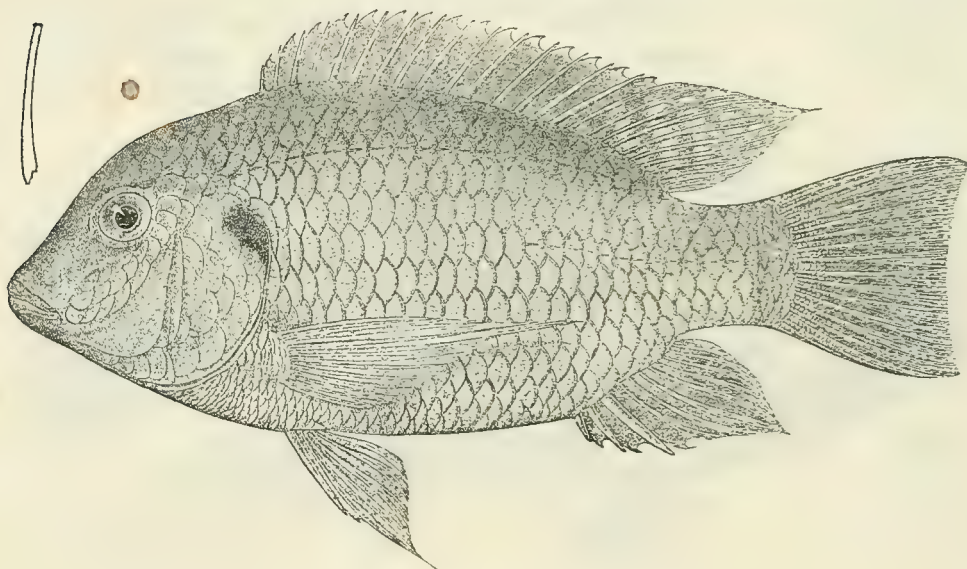
*Chromis niloticus*, part., Steind. Sitzb. Ak. Wien, lx. i. 1870, p. 964.

*Chromis rangii*, Rochebr. Actes Soc. Linn. Bord. (4) vi. 1883, p. 133.

*Tilapia microcephala*, Bouleng. Proc. Zool. Soc. 1899, p. 114; Lönnb. Ann. & Mag. N. H. (7) xii. 1903, p. 41.

Depth of body 2 to  $2\frac{1}{4}$  times in total length, length of head  $2\frac{2}{3}$  to 3 times. Head  $1\frac{3}{4}$  to 2 times as long as broad; snout rounded, with straight or convex upper profile, as long as broad or a little broader than long,  $\frac{2}{3}$  to  $\frac{4}{5}$  postocular part of head; eye 3 (young) to 5 times in length of head, 1 (young) to  $1\frac{2}{3}$  times interorbital width, much shorter than præorbital depth in adult; mouth rather small,  $\frac{1}{2}$  to  $\frac{3}{5}$  width of head, extending to below nostril or a little beyond; teeth in 3 (young) to

Fig. 111.



*Tilapia heudeloti*.  
Senegal.  $\frac{1}{2}$ .

7 series, 40 (young) to 110 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part not more than diameter of eye. Gill-rakers short, 15 to 19 on lower part of anterior arch. Dorsal XV–XVI (rarely XIV or XVII) 11–13; spines subequal from the sixth, or last longest,  $\frac{2}{7}$  to  $\frac{1}{2}$  length of head; longest soft ray  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Anal III 8–11; third spine  $\frac{2}{7}$  to  $\frac{2}{5}$  length of head. Pectoral  $1\frac{1}{5}$  to  $1\frac{1}{3}$  times as long as head, reaching vertical of origin of anal, or beyond. Ventral reaching anal or vent, or not quite so far. Caudal truncate or feebly but distinctly emarginate. Caudal peduncle deeper than long. Scales cycloid, 27–30  $\frac{2\frac{1}{2}-3}{12-13}$ ; lateral lines  $\frac{17-21}{8-14}$ . Olive above, golden



beneath, uniform or with more or less distinct dark bars in the young; a blackish opercular spot; soft dorsal with dark and light spots forming oblique streaks, with a large black spot at the base of its anterior part in the young.

Total length 300 millim.

Senegal to Gaboon.—Type in Paris Museum.

1-10, 11-19. Ad.,	St. Louis, Senegal.	M. P. Delhez (C.).
hgr., & yg.		
20. Skel.	" "	" "
21. Hgr.	Sacred Lake, Bucumachi, nr. Kumasi R., Ashantee.	C. Beddington, Esq. (P.).
22. Yg.	Sapelle, Niger Delta.	Mr. J. Paul Arnold (C.).
23, 24-33. Hgr. &	Cross R. district, Old Calabar.	Major W. A. C. Cockburn
yg.		(P.).
34. Hgr.	Meme R., Cameroon.	Mr. G. Linnell (C.); Prof. E. Lönnberg (P.).
35-36. Ad.	Ja R. at Efayong, S. Cameroon.	G. L. Bates, Esq. (C.).
37. Hgr.	Nyong R. at Akonolinga, S. Cameroon.	" "
38. Hgr.	Gaboon.	
39-40. Types of	W. Africa.	Haslar Collection.
<i>Chrom. micro-</i>		
<i>cephalus.</i>		

This species is very nearly connected with *T. galilæa*.

#### 16. TILAPIA MULTIFASCIATA.

*Chromis multifasciatus*, Günth. Proc. Zool. Soc. 1902, ii. p. 333, pl. xxxi.

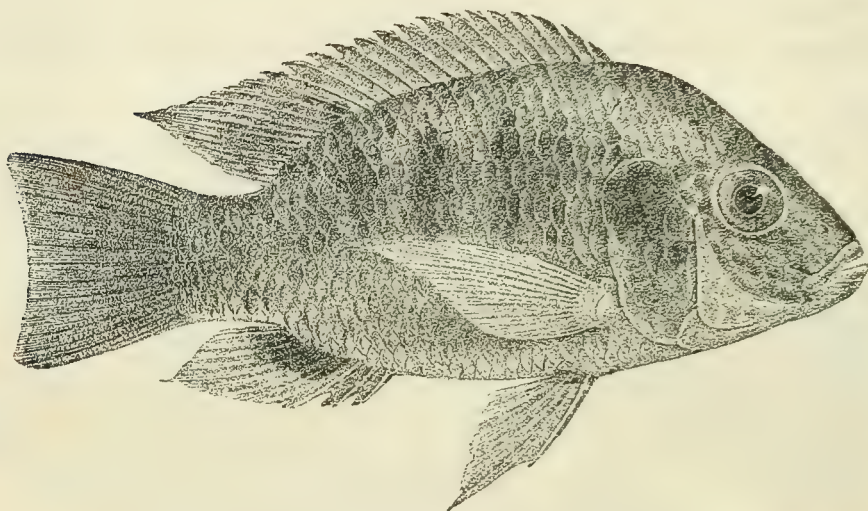
*Tilapia multifasciata*, Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 316.

Depth of body  $2\frac{1}{4}$  to  $2\frac{1}{2}$  times in total length, length of head  $2\frac{3}{5}$  to  $2\frac{3}{4}$  times. Head  $1\frac{4}{5}$  to 2 times as long as broad; snout rounded, with straight or convex upper profile, a little broader than long, as long as or a little shorter than postocular part of head; eye 3 (young) to 4 times in length of head, 1 (young) to  $1\frac{1}{2}$  times in interorbital width, as long as or a little longer than præorbital depth; mouth rather small,  $\frac{1}{2}$  to  $\frac{3}{5}$  width of head, extending a little beyond vertical of nostril; teeth in 3 (young) to 5 series, 50 (young) to 90 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, 18-21 on lower part of anterior arch. Dorsal XV-XVI (rarely XIV) 12-13; spines subequal from the sixth, or last longest, about  $\frac{2}{3}$  length of head; longest soft ray  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head.



Anal III 9-11; third spine  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head. Pectoral 1 to  $1\frac{1}{5}$  times as long as head, reaching vertical of origin of anal, or beyond. Ventral reaching vent, or not quite so far. Caudal truncate or slightly emarginate. Caudal peduncle deeper than long. Scales cycloid, 28-31  $\frac{2\frac{1}{2}-3}{11-12}$ ; lateral lines  $\frac{13-20}{4-12}$ . Olive-brown above, yellowish beneath, with 5 to 9 more or less distinct dark vertical bars on

Fig. 112.

*Tilapia multifasciata.*Type, after Günther (l. c.).  $\frac{5}{6}$ .

the side; a black opercular spot; a more or less distinct black spot (ocellar in the young) on the basal part of the origin of the soft dorsal.

Total length 140 millim.

Gold Coast.

1-15. Types.

Lake Busum-chi.

R. B. N. Walker, Esq. (C.);  
Dr. A. Günther (P.).

#### 17. TILAPIA MACROCEPHALA.

*Sarotherodon melanotheron* (nom. nud.), Rüpp. Verz. Mus. Senck. iv. p. 21 (1852);  
Günth. Cat. Fish. iv. p. 273 (1862).

*Chromis macrocephalus* (Bleek.), Günth. l. c.

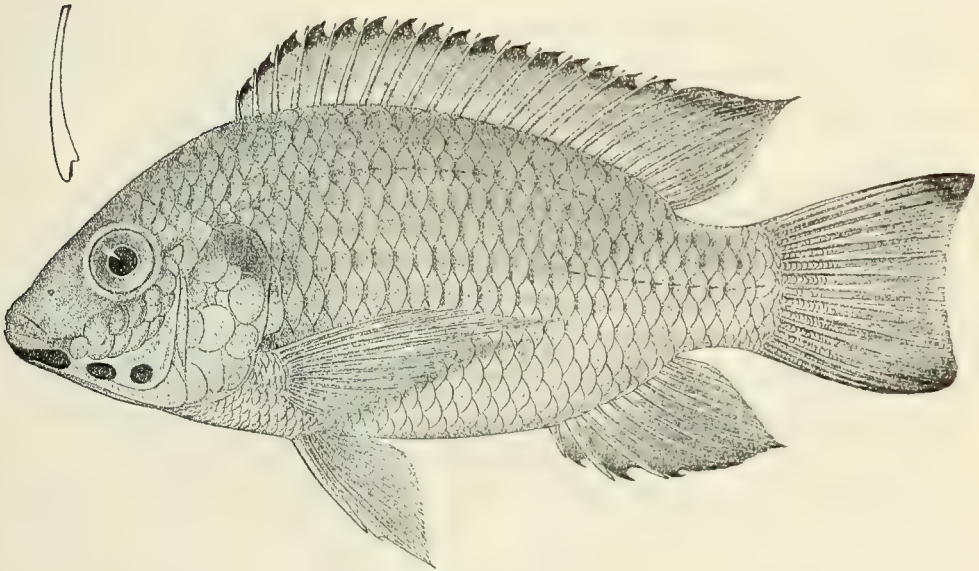
*Melanogenes macrocephalus*, Bleek. Nat. Verh. Vet. Haarlem, xviii. 1863, no. 2,  
p. 36, pl. vi. fig. 2.

*Tilapia macrocephala*, Bouleng. Proc. Zool. Soc. 1899, p. 115; Pellegr. Mém. Soc.  
Zool. France, xvi. 1904, p. 316.

Depth of body  $2\frac{1}{5}$  to  $2\frac{1}{2}$  times in total length, length of head  $2\frac{2}{5}$  to

3 times. Head  $1\frac{2}{3}$  to 2 times as long as broad; snout with straight or convex upper profile, a little broader than long,  $\frac{2}{3}$  to  $\frac{5}{6}$  postocular part of head; eye 3 (young) to  $4\frac{1}{2}$  times in length of head, 1 (young) to  $1\frac{2}{3}$  times in interorbital width, equal to or less than præorbital depth; mouth rather small,  $\frac{3}{5}$  to  $\frac{2}{3}$  width of head, extending a little beyond vertical of nostril; teeth in 3 (young) to 6 series, 50 to 74 in outer series of upper jaw; 2 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, 15 to 18 on lower part of anterior arch. Dorsal XV-XVI 10-12; spines subequal from the sixth, or last longest,  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{2}{3}$  to  $\frac{3}{4}$

Fig. 113.

*Tilapia macrocephala.*Lagos.  $\frac{5}{6}$ .

length of head. Anal III 7-9; third spine  $\frac{2}{5}$  length of head. Pectoral 1 to  $1\frac{1}{4}$  times length of head, extending to vertical of origin of anal or a little beyond. Ventral reaching vent or anal, or not so far. Caudal truncate or feebly emarginate. Caudal peduncle deeper than long. Scales cycloid, 27-30  $\frac{2-2\frac{1}{2} \text{ (rarely 3)}}{11-13}$ ; lateral lines  $\frac{17-21}{10-13}$ . Brown above, yellow or white beneath; a black opercular spot; chin and throat or lower half of head often black, or spotted or marbled with black; dorsal and caudal sometimes with round light spots; anal grey or black; ventrals

often black; dorsal sometimes edged with black; the angles of the caudal sometimes black; young with rather indistinct dark bars on the side.

Total length 165 millim.

Gold Coast, Ashantee, Lagos.—Types in Leyden Museum.

1-4. Ad.	Ancobra R., Gold Coast.	Major Burton and Capt. Cameron (P.).
5. Ad.	Seconda Lagoon, „	W. P. Lowe, Esq. (C.).
6-21, 22-41. Ad., hgr., & yg.	Lagos Lagoon.	Major G. E. Bruce (P.).
42. Skel.	„	„
43-62. Yg.	Lagos.	„
63-64. Hgr. & yg.	W. Africa.	Mr. E. Reichelt (P.).

This and the preceding species may ultimately have to be regarded as varieties of *T. heudeloti*. I am unable to find characters by which to separate them sharply.

#### 18. TILAPIA NGOMENSIS.

Pellegr. Bull. Soc. Zool. France, xxxviii. 1913, p. 274.

Depth of body hardly 2 times in total length, length of head 3 times. Snout nearly as long as eye, which is  $3\frac{1}{3}$  times in length of head and  $1\frac{1}{3}$  times in interorbital width; mouth extending to below anterior border of eye; teeth in 5 series, 60 in outer series of upper jaw; 4 series of scales on the cheek. 16 gill-rakers on lower part of anterior arch. Dorsal XVI 13; spines subequal from the seventh. Anal III 10. Pectoral a little longer than head, reaching vertical of origin of anal. Ventral reaching anal. Caudal rounded. Caudal peduncle deeper than long. Scales cycloid,  $33\frac{3\frac{1}{2}}{12}$ ; lateral lines  $\frac{24}{14}$ . Yellowish, with 7 broad brown bars on the sides and a large black spot at the base of the first soft rays of the dorsal; fins purplish.

Total length 190 millim.

Ngomo, Ogowe.—Type in Paris Museum.

#### 19. TILAPIA HAUGI.

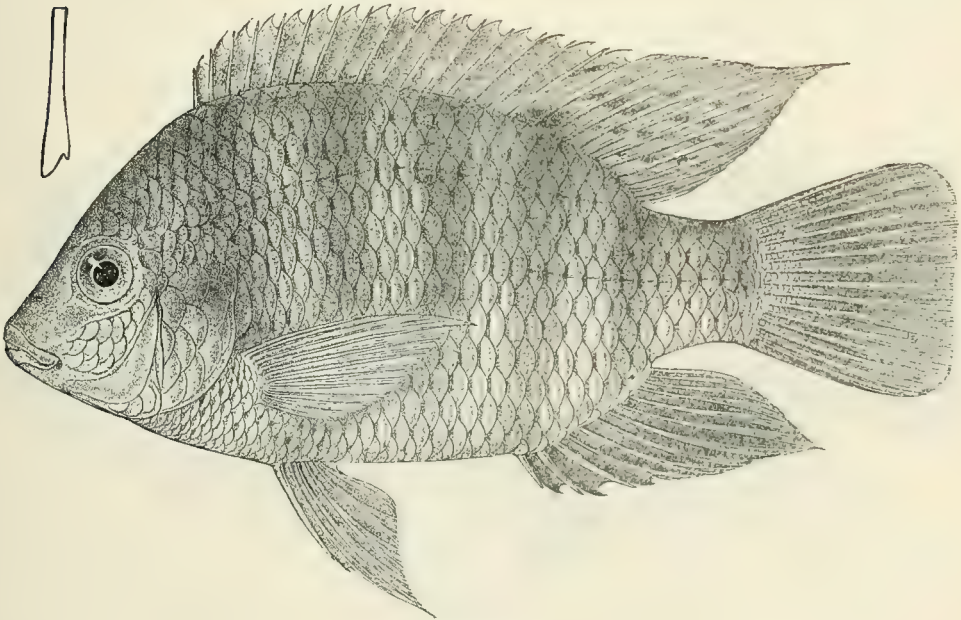
Pellegr. Bull. Soc. Philom. (10) iii. 1911, p. 274, fig.

Depth of body 2 to  $2\frac{1}{5}$  times in total length, length of head 3 times or slightly over 3 times. Head nearly twice as long as broad; snout rounded, with straight upper profile, a little longer than broad, as long as or a little shorter than postocular part of head; eye  $3\frac{1}{2}$  to 4 times in length of head,  $1\frac{2}{5}$  to  $1\frac{2}{3}$  times in interorbital width, a little less



than præorbital depth; mouth moderate,  $\frac{2}{3}$  width of head, extending to between nostril and eye; teeth in 5 or 6 series, 44 to 60 in outer series of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 16–18 on lower part of anterior arch. Dorsal XVI 12–13; spines subequal from the sixth or last longest,  $\frac{1}{3}$  to  $\frac{1}{2}$  length of head; longest soft ray a little shorter or a little longer than head. Anal III 9–10; third spine  $\frac{3}{7}$  length of head. Pectoral as long as or slightly shorter than head, not reaching vertical of origin of anal. Ventral reaching anal. Caudal rounded-subtruncate. Caudal peduncle deeper than long. Scales cycloid,

Fig. 114.

*Tilapia haugi.*

Type. ♂.

30–31  $\frac{3\frac{1}{2}}{12}$ ; lateral lines  $\frac{20-22}{11-15}$ . Brown, with four to six more or less distinct broad darker vertical bands; a blackish opercular spot; fins purplish brown with very indistinct small darker spots on the soft dorsal, and a large dark spot at the base of the origin of the latter.

Total length 220 millim.

Ogowe.—Type in Paris Museum.

- |                      |                     |  |
|----------------------|---------------------|--|
| 1. One of the types. | Ngomo, Lower Ogowe. | Rev. E. Haug (C.);<br>Paris Museum (E.). |
| 2. Hgr.              | L. Ogemwe, Ogowe.   | Dr. W. J. Ansorge (C.).                  |

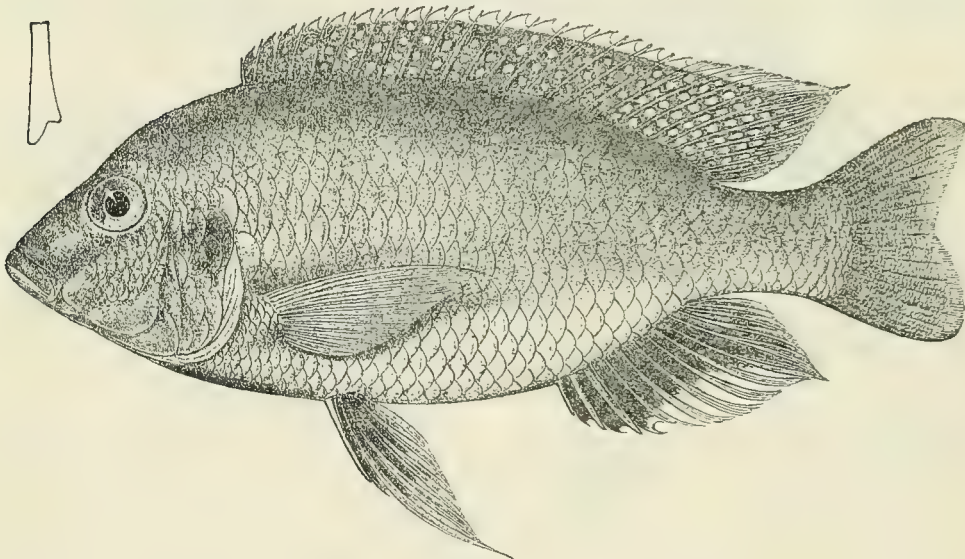


## 20. TILAPIA AUROMARGINATA.

Bouleng. Ann. & Mag. N. H. (8) ii. 1908, p. 241.

Depth of body  $2\frac{1}{2}$  times in total length, length of head  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times. Head twice as long as broad; snout rounded, with straight or slightly convex upper profile, nearly as long as broad, as long as postocular part of head; eye  $3\frac{1}{2}$  to 4 times in length of head,  $1\frac{1}{3}$  times in interorbital width, equal to præorbital depth; mouth moderate,  $\frac{2}{3}$  width of head, extending to between nostril and eye; teeth small, many on the sides simply conical, in 4 or 5 series, 60 to 80 in outer series of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers rather short, tuberculate, 15 to 17

Fig. 115.



*Tilapia auromarginata*.

Type.  $\frac{1}{2}$ .

on lower part of anterior arch. Dorsal XVII-XVIII 11; spines increasing in length to the last, which is a little less than  $\frac{1}{2}$  length of head; longest soft rays  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head. Anal III 10; third spine  $\frac{1}{3}$  length of head. Pectoral as long as head, not reaching origin of anal. Ventral reaching origin of anal. Caudal densely scaled, distinctly emarginate. Caudal peduncle  $1\frac{1}{4}$  to  $1\frac{1}{3}$  times as long as deep. Scales cycloid or very indistinctly denticulate, 33-35  $\frac{4}{12-13}$ ; lateral lines  $\frac{18-24}{15-17}$ . Dark blue above, bluish white beneath; dorsal and anal dark blue,

edged with bright yellow, the former with round red spots forming regular series between the rays; caudal with small round red spots.

Total length 240 millim.

Lake Nyassa.

1-2. Types.

L. Nyassa.

Capt. E. L. Rhoades (P.).

3. Skel.

"

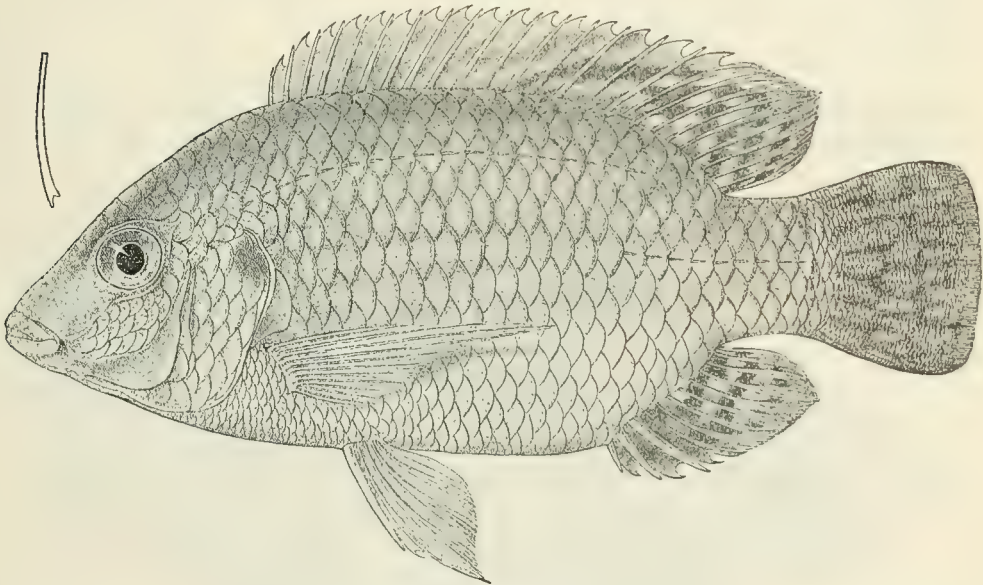
"

## 21. TILAPIA LEPIDURA.

Bouleng. Proc. Zool. Soc. 1899, p. 116, and Poiss. Bass. Congo, p. 459 (1901);  
Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 317.

Depth of body  $2\frac{1}{4}$  to  $2\frac{1}{2}$  times in total length, length of head  $2\frac{3}{4}$  to 3 times. Head  $1\frac{2}{3}$  to  $1\frac{4}{5}$  times as long as broad; snout with convex

Fig. 116.



*Tilapia lepidura.*

Type, from Angola.  $\frac{5}{6}$ .

upper profile, broader than long, as long as or a little shorter than postocular part of head; eye  $3\frac{2}{3}$  to 4 times in length of head,  $1\frac{1}{2}$  to 2 times in interorbital width, equal to or a little less than præorbital depth; mouth rather small,  $\frac{3}{5}$  width of head, extending to between nostril and eye; teeth extremely slender, in 4 series, 80 to 88 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, 17 to 20 on lower part of anterior arch. Dorsal XVI 10-12; last spine longest,  $\frac{2}{5}$  to

$\frac{1}{2}$  length of head. Anal III 8-9; third spine nearly as long as last dorsal. Pectoral as long as or a little longer than head, reaching vertical of origin of anal or not quite so far. Ventral reaching vent. Caudal rounded, densely scaled. Caudal peduncle deeper than long. Scales cycloid, 29-32  $\frac{3-3\frac{1}{2}}{12-13}$ ; lateral lines  $\frac{17-21}{11-13}$ . Brownish above, golden yellow beneath; blackish spots on the dorsal and anal, confluent into oblique bands on the soft dorsal; a wide-meshed blackish network on the caudal, disappearing with age.

Total length 190 millim.

Angola, Congo.

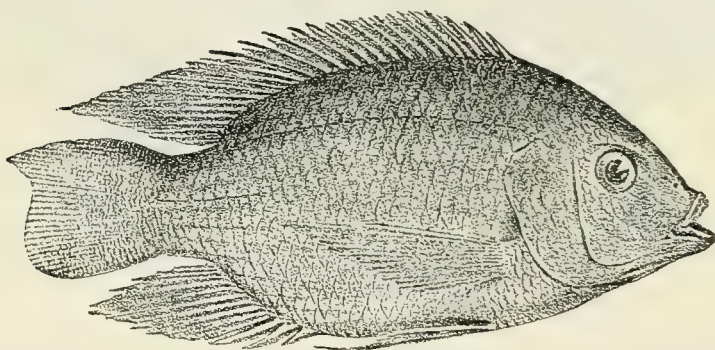
1. Type.	Angola.	J. J. Monteiro, Esq. (C.).
2. Type.	Lower Congo.	M. F. Hens (C.).
3. Hgr.	Boma, Lower Congo.	Mr. J. Paul Arnold (P.).
4. Ad.	Bolobo, Upper Congo.	Rev. G. Grenfell (P.).

## 22. TILAPIA BOULENGERI.

Pellegr. Bull. Mus. Paris, 1903, p. 121, and Mém. Soc. Zool. France, xvi. 1904, p. 318, pl. v. fig. 3.

Depth of body 2 times in total length, length of head  $2\frac{3}{4}$  times. Upper profile of head descending in a strong curve; snout rounded,

Fig. 117.



*Tilapia bouleengeri.*

Type, after Pellegrin (Mém. Soc. Zool. France, 1904).

a little shorter than postocular part of head; eye 4 times in length of head, less than depth of præorbital; mouth rather small,  $\frac{3}{5}$  width of head, extending a little beyond nostril; teeth in 6 series; 2 series of scales on the cheek. Gill-rakers short, 22 on lower part of anterior arch. Dorsal XVI 12; last spine longest,  $\frac{1}{2}$  length of head.



Anal III 10. Pectoral as long as head, reaching vertical of origin of anal. Ventral reaching anal. Caudal densely scaled, emarginate, pointed above, rounded beneath. Caudal peduncle much deeper than long. Scales cycloid,  $29 \frac{3\frac{1}{2}}{12}$ ; lateral lines  $\frac{21}{9}$ . Brown above, golden beneath; a dark opercular spot; fins uniform greyish.

Total length 203 millim.

Upper Congo (Nganchou).—Type in Paris Museum.

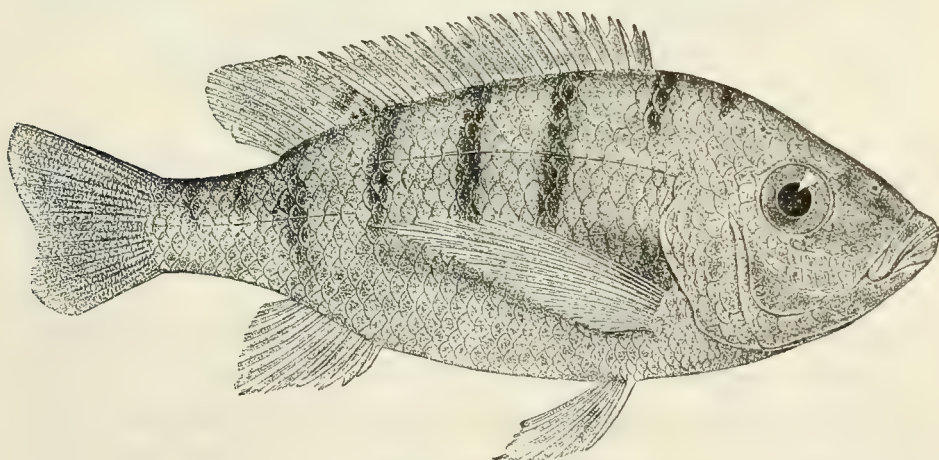
### 23. TILAPIA SQUAMIPINNIS.

*Chromis squamipinnis*, Günth. Proc. Zool. Soc. 1864, p. 311, and 1893, p. 621, pl. liii.

*Tilapia squamipinnis*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 4, and Proc. Zool. Soc. 1899, p. 177; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 318.

Depth of body  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times in total length, length of head  $2\frac{2}{3}$  to 3 times. Head  $1\frac{3}{4}$  to 2 times as long as broad; snout rounded, with straight or convex upper profile, about  $\frac{2}{3}$  as long as broad,  $\frac{3}{4}$  to  $\frac{4}{5}$  postocular part of head; eye 3 (young) to  $5\frac{1}{2}$  times in length of head,  $1\frac{1}{3}$  (young) to  $2\frac{2}{3}$  times in interorbital width, equal to preorbital depth

Fig. 118.



*Tilapia squamipinnis*.

Type, after Günther (P. Z. S. 1893).  $\frac{2}{5}$ .

in adult; mouth moderate,  $\frac{1}{2}$  to  $\frac{2}{3}$  width of head, extending to between nostril and eye; teeth in 4 (young) to 7 series\*, 50 (young) to 110 in

\* In one of the specimens received from Capt. Rhoades, all the outer teeth are conical, without secondary cusps.



outer series of upper jaw; 2 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers moderate, 17 to 21 on lower part of anterior arch. Dorsal XVI 10-11; spines subequal from middle ones, or last longest,  $\frac{2}{7}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Anal III 8-9; third spine  $\frac{1}{4}$  to  $\frac{2}{7}$  length of head. Pectoral as long as or slightly longer than head, reaching origin of anal or a little beyond. Ventral reaching vent or not so far. Caudal densely scaled, rounded with a feeble median notch, or upper angle pointed. Caudal peduncle a little longer than deep. Scales cycloid, 32-36  $\frac{3\frac{1}{2}}{14-16}$ ; lateral lines  $\frac{20-22}{12-18}$ . Pale greyish olive, with or without 8 more or less regular blackish cross-bars, or dark brown to bluish-black; soft dorsal with oblique dark streaks, or fins bluish-black with a yellow or orange edge; the blackish cross-bars constant in the young, which bear a large black spot on the anterior part of the soft dorsal.

Total length 300 millim.

Lake Nyassa and Upper Shiré River.

1-6. Skins, types.	L. Nyassa.	Sir J. Kirk (C.).
7. Ad.	"	Prof. J. E. S. Moore (C.).
8-12. Ad.	"	Capt. E. L. Rhoades (P.).
13. Skel.	"	"
14-23. Yg.	L. Nyassa, between Kondowe and Karonga.	A. Whyte, Esq. (C.); Sir H. H. Johnston (P.).
24-30. Yg.	L. Nyassa and Upper Shiré.	" "
31-32. Ad. & hgr.	Upper Shiré.	Dr. P. Rendall (C.); Sir H. H. Johnston (P.).

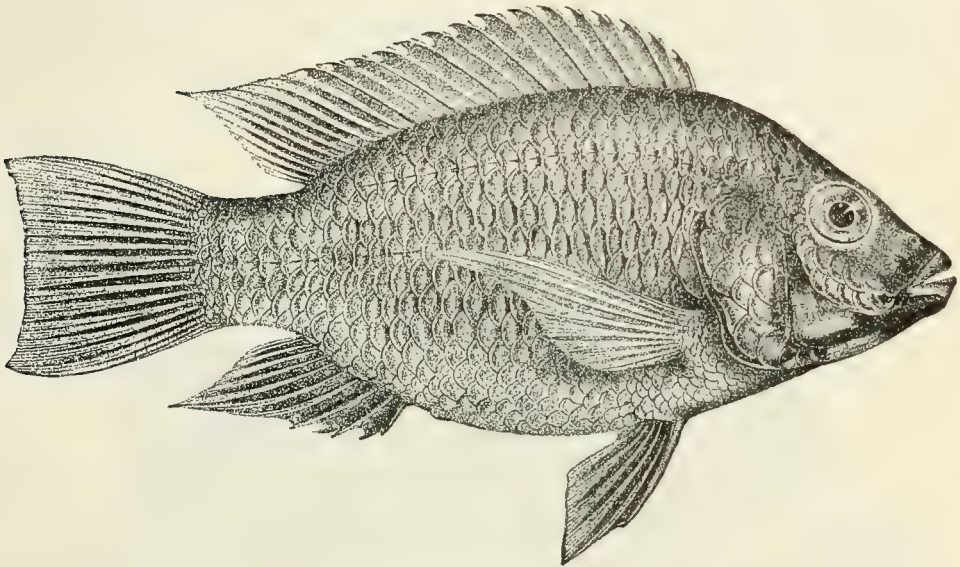
#### 24. TILAPIA DOLLOI.

Bouleng. Ann. Mus. Congo, Zool. i. p. 123, pl. xlv. fig. 5 (1899), and Poiss. Bass. Congo, p. 467 (1901); Pellegr. Mém. Soc. Zool. France, xiv. 1904, p. 332.

Depth of body 2 to  $2\frac{1}{2}$  times in total length, length of head  $2\frac{1}{2}$  to 3 times. Head  $1\frac{3}{4}$  to 2 times as long as broad; snout with straight or slightly convex upper profile, a little broader than long,  $\frac{2}{3}$  to  $\frac{3}{4}$  postocular part of head; eye 3 (young) to  $4\frac{1}{2}$  times in length of head, 1 (young) to  $1\frac{2}{3}$  times in interorbital width, equal to præorbital depth; mouth rather small,  $\frac{3}{5}$  to  $\frac{2}{3}$  width of head, extending a little beyond vertical of nostril; teeth very small, extremely slender at the base, very movable, in 3 to 5 series, 40 (young) to 80 in outer series of upper jaw; 2 (rarely 3) series of scales on the cheek, width of scaly part less than diameter of eye.

Gill-rakers short, 12 to 15 on lower part of anterior arch. Dorsal XV–XVI (rarely XVII) 9–11 \*; spines subequal from the sixth or seventh, or last longest,  $\frac{2}{5}$  to not quite  $\frac{1}{2}$  length of head; longest soft rays  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head. Anal III 8–9; third spine  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head. Pectoral as long as or a little longer than head, extending to vertical of origin of anal or a little beyond. Vertical reaching vent or anal, or not so far. Caudal truncate or feebly but very distinctly emarginate. Caudal peduncle deeper than long. Scales cycloid or very feebly denticulate, 27–31  $\frac{2\frac{1}{2}-3}{11-13}$ ; lateral lines  $\frac{17-20}{11-15}$ . Brown, grey, or olive, with

Fig. 119.

*Tilapia dolloi*.Type (A. M. C.).  $\frac{5}{8}$ .

or without small black spots, belly white; lower half of head often black, or with ink-black spots; young with ill-defined narrow dark bars; pectorals white, other fins grey or black, soft dorsal often with round light spots.

Total length 155 millim.

Spanish Guinea to Congo.—Types in Congo Museum, Tervueren.

1. Hgr.	Benito R., Spanish Guinea.	G. L. Bates, Esq. (C.).
2. Ad.	Sette Cama, Gaboon.	
3–5. Ad., hgr., & yg.	Landana, Portug. Congo.	Dr. Jackson (C.) ; Hon. W. Rothschild (P.).

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\* 14 in one specimen from Chiloango.

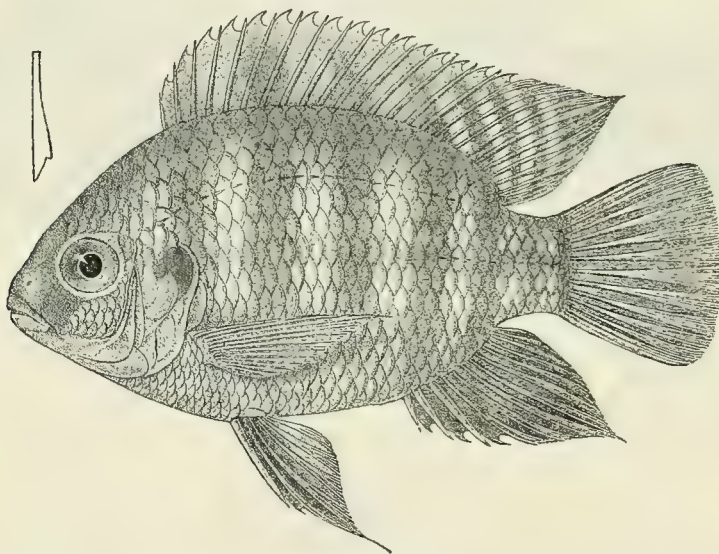
6-14. Ad., hgr., & yg.	Chiloango, Portug. Congo.	Dr. W. J. Ansorge (C.).
15. Skel.	" "	" "
16-17. Two of the types.	L. Obeke, Upper Congo.	M. P. Delhez (C.).

## 25. TILAPIA MARIÆ.

Bouleng. Proc. Zool. Soc. 1899, p. 122, pl. xi. fig. 1; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 323.

Depth of body  $1\frac{4}{5}$  to  $2\frac{2}{5}$  times in total length, length of head  $2\frac{3}{4}$  to 3 times. Head  $1\frac{3}{4}$  to 2 times as long as broad, with convex, upper profile; snout rounded, about  $1\frac{1}{2}$  times as long as broad, as long as or a little shorter than postocular part of head; eye  $2\frac{3}{4}$  (young) to  $3\frac{1}{3}$  times in length of head, 1 to  $1\frac{1}{2}$  times in interorbital width,

Fig. 120



*Tilapia mariae.*  
Oguta.

exceeding præorbital depth; mouth rather small,  $\frac{3}{5}$  to  $\frac{2}{3}$  width of head, extending to between nostril and eye; teeth in 3 to 5 series, outer very small, with very slender shafts, movable, 50 to 64 in upper jaw; 3 or 4 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, 13 to 15 on lower part of anterior arch. Dorsal XVI (rarely XV) 12-13; spines subequal from the fifth, or last longest,  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head; longest soft ray  $\frac{3}{4}$  to once length of head. Anal III 10-11; third spine as long as or shorter than last



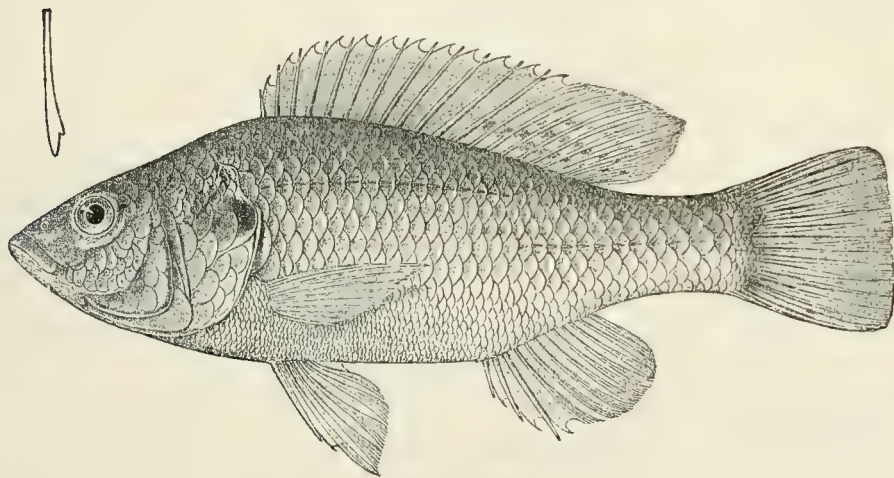
dorsal. Pectoral as long as head, reaching or nearly reaching vertical of origin of anal. Ventral reaching vent or anal. Caudal rounded. Caudal peduncle deeper than long. Scales cycloid, 29-31  $\frac{3-3\frac{1}{2}}{11-12}$ ; lateral lines  $\frac{19-21}{10-16}$ . Pale brownish, with seven or eight very regular dark brown bars, as broad as or a little broader than the interspaces; five of these bands extend on the dorsal, the fourth involving a blackish spot at the base of the origin of the soft dorsal; a dark brown lateral band sometimes present; fins brown, soft dorsal with whitish spots or oblique bands.

Total length 130 millim.

Lower Niger, Lagos.

1-2. Types.	Azuminé Creek, Opobo R., Niger Delta.	Miss Kingsley (C.).
3-4. Ad. & hgr.	Sapelle, Niger Delta.	Dr. W. J. Ansorge (C.).
5. Skel.	" "	"
6-8. Ad. & hgr.	Oguta, Lower Niger.	"
9-10. Yg.	Abo, "	"
11-13. Ad. & hgr.	Ogun R. at Aro, Lagos.	Major G. E. Bruce (P.).

Fig. 121.



*Tilapia manyaræ.*

Type.

## 26. TILAPIA MANYARÆ.

Hilgend. Zool. Jahrb., Syst. xxii. 1905, p. 406.

Depth of body  $2\frac{2}{3}$  to 3 times in total length, length of head  $2\frac{2}{5}$  to  $2\frac{2}{3}$  times. Head twice as long as broad; snout with straight upper profile,



a little broader than long,  $\frac{1}{2}$  postocular part of head; eye 4 (young) to 6 times in length of head,  $1\frac{1}{3}$  to 2 times in interorbital width, equal to or a little greater than least depth of præorbital; mouth moderate, about  $\frac{2}{3}$  width of head, extending to between nostril and eye; teeth very small, in 2 or 3 rows, outer with extremely slender shaft, 50 to 60 in upper jaw; 3 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 14 or 15 on lower part of anterior arch. Dorsal XII–XIII 10–12; spines increasing in length to the last, which measures nearly  $\frac{1}{2}$  length of head; longest soft rays not much longer. Anal III 9–10; third spine  $\frac{2}{5}$  length of head. Pectoral  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head, not reaching vertical of origin of anal. Ventral reaching vent. Caudal truncate (?). Caudal peduncle  $1\frac{1}{2}$  times as long as deep. Scales cycloid, extremely small on breast and belly, 30–32  $\frac{5-6}{19-20}$ ; lateral lines  $\frac{15-17}{9-11}$ . Silvery grey, each scale with a bluish central spot; soft dorsal brownish at the base, with oblique series of light spots.

Total length 115 millim.

Lake Manyara, a salt lake S.W. of Mt. Kilimanjaro, German East Africa.—Types in Berlin Museum.

1–5. Types.

L. Manyara.

Prof. O. Neumann (C.).

## 27. TILAPIA AMPHIMELAS.

Hilgend. Zool. Jahrb., Syst. xxii. 1905, p. 405.

Agrees very closely with the preceding, of which, as suggested by its describer, it is perhaps the male. Outer teeth mostly unicuspid. Caudal peduncle as long as deep. D. XIII 11; A. III 10. Scales apparently as in the preceding. Dirty green, the centres of the scales silvery; breast, belly, ventrals, dorsal, and anal black; caudal greenish yellow; young with about 10 dark cross-bars.

Total length 136 millim.

Lake Manyara.—Types in Berlin Museum.

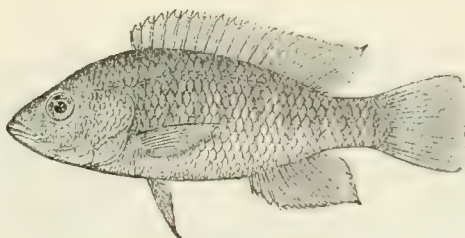
## 28. TILAPIA ALCALICA.

Hilgend. Zool. Jahrb., Syst. xxii. 1905, p. 407.

Depth of body equal to length of head,  $2\frac{1}{2}$  to  $2\frac{3}{5}$  times in total length. Head  $1\frac{3}{5}$  or  $1\frac{2}{3}$  times as long as broad; snout rounded, with straight or slightly convex upper profile, a little broader than long,  $\frac{2}{3}$  postocular part of head; eye  $3\frac{1}{2}$  to  $4\frac{1}{3}$  times in length of head, a little

greater than præorbital depth; mouth moderate, about  $\frac{2}{3}$  width of head, extending to vertical between nostril and eye; teeth in 3 series, outer with extremely slender shafts; 20 to 24 in upper jaw; 3 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, 12 or 13 on lower part of anterior arch. Dorsal XIII 11; spines subequal from the fourth, which measures  $\frac{1}{3}$  length of head; longest soft rays  $\frac{1}{2}$  length of head. Anal III 11; third spine  $\frac{1}{3}$  length of head. Pectoral  $\frac{2}{3}$  length of head, not reaching origin of anal. Ventral not

Fig. 122.

*Tilapia alculica.*Type.  $\times 1\frac{1}{3}$ .

reaching vent. Caudal truncate. Caudal peduncle as long as deep. Scales cycloid, 28–30  $\frac{2\frac{1}{2}}{12}$ ; lateral lines  $\frac{16-17}{+11}$ ; breast and belly naked or covered with minute scales. Brownish above, dirty white beneath; 9 more or less distinct dark cross-bars on the back; each of the scales on the anterior part of the back with a blue vertical streak.

Total length 50 millim.

Volcanic holes near the Nguruman Salt Lake, German East Africa.—Types in Berlin Museum.

1–4. Types.

Nr. L. Nguruman.

Prof. O. Neumann (C.).

## 29. TILAPIA DUBIA.

Lönnb. Ann. & Mag. N. H. (7) xiii. 1904, p. 137.

Depth of body 2 times in total length, length of head 3 times. Snout with straight upper profile, as long as eye, which is 3 times in length of head and  $1\frac{1}{6}$  times in interorbital width; mouth extending to between nostril and eye; teeth in 3 or 4 series, outer rather large and only slightly notched, about 28 in upper jaw; 3 series of scales on the cheek. Gill-rakers short, 13 or 14 on lower part of anterior arch. Dorsal XVI 13; spines subequal from the fifth, about  $\frac{1}{2}$  length of head. Anal III 10, third spine nearly as long as but stouter than longest

dorsal. Pectoral much longer than head and extending a good deal beyond origin of anal. Ventral reaching vent. Caudal? (mutilated in the type). Caudal peduncle nearly  $1\frac{1}{2}$  times as long as deep. Scales cycloid, about 27–28  $\frac{3}{12}$ ; lateral lines  $\frac{21}{2}$ . Seven dark bars on the body; a black opercular spot; a black spot at the base of the anterior soft rays of the dorsal, above the fourth bar; anal and ventrals dusky to blackish.

Total length about 82–85 millim.

Lake Barombi-ba-Kotta, a volcanic lake on the Cameroon Mountain.—Type in Stockholm Museum.

### 30. TILAPIA MELANOPLEURA.

A. Dum. Arch. Mus. x. 1859, p. 252, pl. xxii. fig. 1; Bouleng. Proc. Zool. Soc. 1889, p. 123; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 329, and Bull. Soc. Philom. (9) x. 1908, p. 134; Bouleng. Tr. Zool. Soc. xviii. 1911, p. 417.

*Tilapia affinis*, A. Dum. t. c. p. 255; Bouleng. t. c. p. 127; Pellegr. Bull. Mus. Paris, 1900, p. 277.

*Tilapia polycentra*, A. Dum. t. c. p. 254; Bouleng. t. c. p. 128.

*Chromis polycentra*, Günth. Cat. Fish. iv. p. 270.

*Chromis latus*, Günth. t. c. p. 271 (1862); Steind. Verh. zool.-bot. Ges. Wien, xiv. 1864, p. 227, pl. viii. figs. 1 & 2.

*Chromis melanopleura*, Günth. t. c. p. 272.

*Chromis aureus*, Steind. t. c. p. 229, pl. viii. fig. 5.

*Chromis niloticus*, part., Steind. Sitzb. Ak. Wien, lx. 1870, p. 96.

*Chromis cæruleomaculatus*, Rochebr. Bull. Soc. Philom. (7) iv. 1880, p. 166, and Act. Soc. Linn. Bord. (4) vi. 1883, p. 132, pl. iv. fig. 3.

*Chromis faidherbi*, Rochebr. tt. cc. p. 167, and p. 134, pl. v. fig. 5.

*Chromis affinis*, Rochebr. Act. Soc. Linn. Bord. (4) vi. 1883, p. 131.

*Chromis ogowensis*, Günth. Ann. & Mag. N. H. (6) xvii. 1896, p. 271, and Proc. Zool. Soc. 1899, p. 717, and 1902, ii. p. 331.

*Chromis rendalli*, Bouleng. Proc. Zool. Soc. 1896, p. 915, fig.

*Tilapia rendalli*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 4, and Proc. Zool. Soc. 1899, p. 126.

*Tilapia lata*, Bouleng. Proc. Zool. Soc. 1899, p. 125, and Poiss. Bass. Congo, p. 466 (1901); Steind. Denkschr. Ak. Wien, lxxxix. 1913, p. 60.

*Tilapia sexfasciata*, Pellegr. Bull. Mus. Paris, 1900, p. 276.

*Chromis discolor*, Günth. Proc. Zool. Soc. 1902, ii. p. 332.

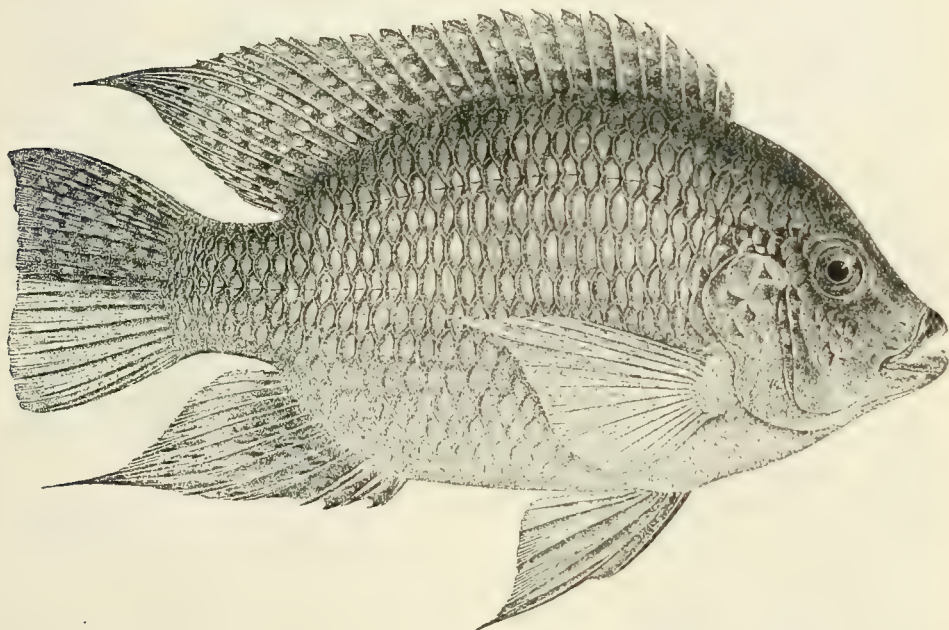
*Tilapia latifrons*, Bouleng. Tr. Zool. Soc. xvii. 1906, p. 571, pl. xl.

Depth of body  $1\frac{5}{6}$  to  $2\frac{1}{3}$  times (rarely  $2\frac{1}{2}$  times) in total length, length of head 3 to  $3\frac{1}{2}$  times. Head  $1\frac{2}{3}$  to 2 times as long as broad; snout with straight or convex, or slightly concave upper profile, as long as



broad or a little broader than long, as long as postorbital part of head; eye 3 (young) to 5 times in length of head, 1 (young) to  $2\frac{1}{4}$  times in interorbital width, less than præorbital depth in adult; mouth moderate,  $\frac{3}{5}$  to  $\frac{3}{4}$  width of head, extending to between nostril and eye; teeth in 3 (young) to 5 more or less regular series, outer largest, 30 (young) to 60 in upper jaw, and separated from the others by a rather wide interspace; 3 or 4 series of scales on the cheek, width of scaly part greater than diameter of eye in adult. Gill-rakers short, 8 to 12 on lower part of

Fig. 123.

*Tilapia melanopleura.*

Type of *T. latifrons* (Tr. Z. S. 1906).  $\frac{1}{3}$ .

anterior arch. Dorsal XV-XVI 10-14; last spine longest,  $\frac{2}{5}$  to  $\frac{2}{3}$  length of head; middle soft rays more or less produced in adult, usually as long as or a little longer than head. Anal III 9-11; third spine usually shorter than the longest dorsal. Pectoral 1 to  $1\frac{1}{4}$  times as long as head, often extending nearly to vertical of origin of anal. Ventral usually reaching vent or anal. Caudal truncate or feebly emarginate. Caudal peduncle deeper than long. Scales cycloid or very feebly denticulate, 29-32  $\frac{2\frac{1}{2}-3\frac{1}{2}}{11-14}$ ; lateral lines  $\frac{18-22}{11-16}$ . Olive-brown, with or without 4 to 6 very indistinct darker bars; a black opercular spot; dorsal fin with blackish oblique streaks, or grey or blackish, with or without



round light spots ; a large black spot at the base of the anterior part of the soft dorsal, sometimes disappearing with age ; caudal sometimes with round light spots, or with a dark network.

Total length 330 millim.

West Africa, from the Senegal to Angola, Congo and Zambesi systems, Bechuanaland, Zululand. Type in Paris Museum.

1-7. Ad., hgr.,	St. Louis, Senegal.	M. P. Delhez (C.).
& yg.		
8-9. Yg.	Kaëdi, „	„
10-17. Ad., hgr.,	Gambia.	J. S. Budgett, Esq. (C.).
& yg.		
18. Yg.	„	Sir A. Moloney (P.).
19-21. Ad., hgr.,	Culufi R., Portug. Guinea.	Dr. W. J. Ansorge (C.).
& yg.		
22. Ad.	Geba R., „	„
23-27. Ad., hgr.,	Nana Kru, Liberia.	W. P. Lowe, Esq. (C.).
& yg.		
28-29. Ad. & yg.	Kotchwah R., Gold Coast.	R. B. N. Walker, Esq. (C.).
30-31. Ad.	Prah R., „	„
32-34. Ad. & hgr.	Kakum R., „	„
35-36. Hgr.	Nyankoma, „	R. B. N. Walker, Esq. (C.) ; Dr. A. Günther (P.).
37-38. Hgr.	Dunkwa R., „	„ „
39-41. Types of	L. Busum-chi, „	„ „
<i>Chromis discolor.</i>		
42-51. Ad., hgr.,	Lagos Lagoon.	Major G. E. Bruce (P.).
& yg.		
52. Ad.	Niger.	Mr. I. J. Dalton (C.)
53-54. Ad. & hgr.	Niger.	W. A. Forbes, Esq. (P.).
55-56. Ad. &	Oguta, Lower Niger.	Dr. W. J. Ansorge (C.).
hgr.		
57-58. Hgr. &	Sapelle, „	„
yg.		
59-61. Hgr. & yg.	Agberi, „	„
62-65. Yg.	Degama, „	„
66-67. Hgr. &	Benue R., N. of Ibi.	H. L. Norton Traill, Esq. (C.).
yg.		
68. Hgr.	Oban District, Old Calabar.	P. A. Talbot, Esq. (P.).
69-71. Ad. & yg.	Warri, „	Miss Kingsley (C.).
72. Yg.	Old Calabar.	„
73-75. Ad. & hgr.	Kribi R., S. Cameroon.	G. L. Bates, Esq. (C.).
76-79. Ad. & yg.	Ja R., „	„
80-86. Ad. & yg.	Benito R., Spanish Guinea.	„

87. Ad.	Gaboon.	R. B. N. Walker, Esq.
88, 89-92. Hgr.	"	
93. Ad.	Ngomo, Ogowe.	Rev. E. Haug (C.) ; Paris Museum (E.).
94-96. Types of <i>C. ogowensis</i> .	Lambarene, Ogowe.	Miss Kingsley (C.).
97-99. Hgr.	Chiloango Town, Portuguese Congo.	Dr. W. J. Ansorge (C.).
100. Ad.	Kuka Muno, Luculla R., Chiloango.	"
101. Type of <i>C. latus</i> .	W. Africa.	Mr. L. Fraser (C.).
102-103. Ad.	Quanza R. at Cunga, Angola.	Dr. W. J. Ansorge (C.).
104-113. Hgr. & yg.	Dongwenna Swamps, Mossamedes.	"
114. Ad.	Stanley Falls, Upper Congo.	Rev. W. H. Bentley (C.).
115. Skel.	" "	"
116. Yg.	Banzville, Ubanghi.	Capt. Royaux (C.).
117. Type of <i>T. latifrons</i> .	Kituta, L. Tanganyika.	Dr. W. A. Cunningham (C.).
118-121. Hgr. & yg.	L. Mweru at Lukonzolwa.	Dr. L. Stappers (C.).
122-124. Hgr.	Luapula R. at Kasenge.	"
125-126, 127-130. Ad., hgr., & yg.	L. Bangwelu.	F. W. Molland, Esq. (P.).
131. Ad.	L. Nyassa.	Prof. J. E. S. Moore (C.).
132. Skel.	"	"
133-135. Types of <i>C. rendalli</i> .	Upper Shiré R.	Dr. P. Rendall (C.) ; Sir H. H. Johnston (P.).
136. Ad.	Chiromo, Shiré R.	R. MacDonald, Esq. (P.).
137. Ad.	" "	C. B. C. Storey, Esq. (P.).
138. Ad.	Maramba R., 2 miles above Victoria Falls.	T. Codrington, Esq. (P.).
139. Hgr.	Idunda R., Portuguese E. Africa.	C. F. M. Swynnerton, Esq. (P.).
140. Ad.	Klein Letaba R., Transvaal.	Hon. P. A. Methuen (P.).
141. Ad.	L. Sibayi, Zululand.	Dr. E. Warren (P.).
142-145. Ad. & hgr.	Okovango R., L. Ngami District.	R. B. Woosnam, Esq. (C.).

This species appears to be completely connected with the preceding.

Under the name of *Tilapia lata*, var. *camerunensis*, Lönnberg, Ann. & Mag. N. H. (7) xii. 1903, p. 41, has described a single specimen from the Meme River, Cameroon, which appears to differ only in having a smaller number of scales in a longitudinal series, viz. 26.

31. *TILAPIA MEEKI*.

Pellegr. Bull. Soc. Zool. France, xxxvi. 1911, p. 185, and Ann. Instit. Océanogr. vi. 4, 1914, p. 63, pl. ii. fig. 2.

Depth of body  $1\frac{3}{4}$  to 2 times in total length, length of head  $2\frac{4}{5}$  to 3 times. Eye  $3\frac{1}{2}$  to 4 times in length of head,  $1\frac{1}{3}$  to  $1\frac{2}{3}$  times in interorbital width; mouth about  $\frac{2}{5}$  width of head, extending a little beyond vertical of nostril; teeth small, in several series, 60 in outer series of upper jaw; 3 series of scales on the cheek. 14 gill-rakers on lower part of anterior arch. Dorsal XV 14; last spine longest,  $\frac{1}{2}$  or nearly  $\frac{1}{2}$  length of head. Anal III 10–11; third spine a little shorter than last dorsal. Pectoral nearly as long as head. Ventral reaching anal. Caudal rounded. Caudal peduncle much deeper than long. Scales cycloid,  $30\frac{3\frac{1}{2}}{11}$ ; lateral lines  $\frac{21}{11-12}$ . Brownish, with a black opercular spot and five or six large black spots along the side of the body; vertical fins and ventrals blackish.

Total length 180 millim.

Lagoon in Ivory Coast.—Types in Paris Museum.

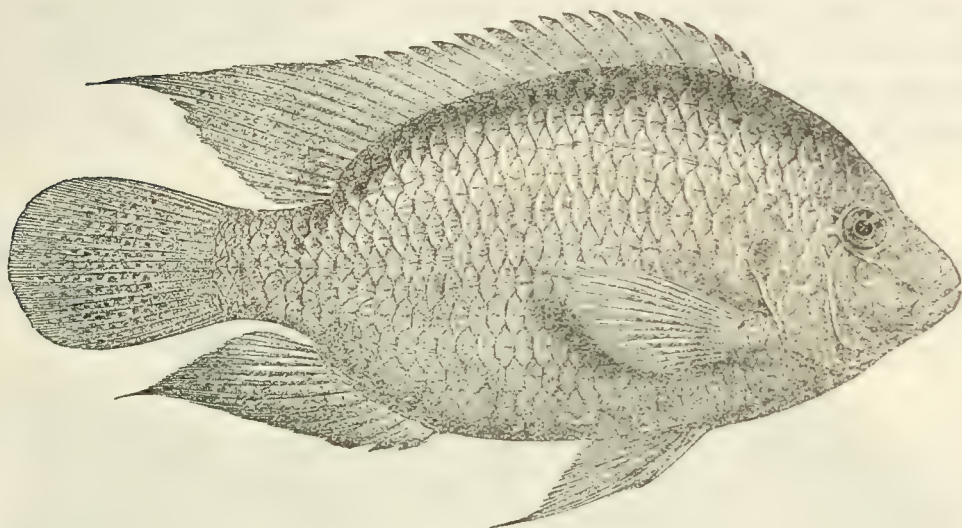
32. *TILAPIA CABRÆ*.

Bouleng. Ann. Mus. Congo, Zool. i. p. 51, pl. xxvii. (1899), and Poiss. Bass. Congo, p. 469 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 323.

Depth of body  $1\frac{4}{5}$  to  $2\frac{1}{5}$  times in total length, length of head  $2\frac{3}{4}$  to  $3\frac{1}{3}$  times. Head  $1\frac{1}{2}$  to  $1\frac{3}{4}$  times as long as broad, with convex or slightly concave upper profile; snout  $1\frac{1}{3}$  to  $1\frac{2}{3}$  times as broad as long, as long as or a little shorter than postocular part of head; eye 3 (young) to  $4\frac{1}{2}$  times in length of head, 1 (young) to 2 times in interorbital width, a little less than præorbital depth in adult; mouth moderate,  $\frac{2}{3}$  to  $\frac{3}{4}$  width of head, extending to between nostril and eye; teeth in 3 (young) to 8 series, outer largest, 30 (young) to 80 in upper jaw, and separated from the others by a rather wide interspace; 3 or 4 series of scales on the cheek, width of scaly part greater than diameter of eye in adult. Gill-rakers short, 12 to 15 on lower part of anterior arch. Dorsal XV–XVI (rarely XIV or XVII) 12–13; last spine longest,  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head; middle soft rays more or less produced in adult, usually as long as or a little longer than head. Anal III 10–11; third spine shorter than longest dorsal. Pectoral  $\frac{4}{5}$  to once length of head, not reaching vertical of origin of anal. Ventral usually reaching vent or anal. Caudal rounded. Caudal peduncle deeper than long. Scales cycloid,

28-31  $\frac{3\frac{1}{2}}{11-13}$ ; lateral lines  $\frac{20-22}{10-16}$ . Olive-brown, young with 5 or 6 broad darker vertical bands which disappear more or less completely in the adult; a blackish opercular spot; young with a large black spot at the base of the last spines and the first soft rays of the dorsal, becoming

Fig. 124.

*Tilapia cabre.*Type (A. M. C.).  $\frac{2}{5}$ .

indistinct or disappearing in the adult; soft dorsal, anal, and caudal dark, with or without small round light spots or with dark vermiculations, sometimes with a light edge.

Total length 300 millim.

Chiloango and Angola.—Type in Congo Museum, Tervueren.

1. One of the types.	Kaika N'Zobe, Loango.	Major Cabra (C.).
2-5. Ad. & hgr.	Loango R. above N'Kutu.	Dr. W. J. Ansorge (C.).
6-10. Hgr. & yg.	Luali R. at Buco Zau, Chiloango.	"
11. Ad.	Lebuzi R. at Boma Vonde, Chiloango.	"
12. Ad.	Lebuzi R. at Kuka Muno, Chiloango.	"
13-16. Ad. & hgr.	Quanza R. at Cunga, Angola.	"
17. Skel.	" "	"
18-20. Ad. & yg.	" at Muno, "	"
21. Ad.	L. Rumango, Bengo R., "	"

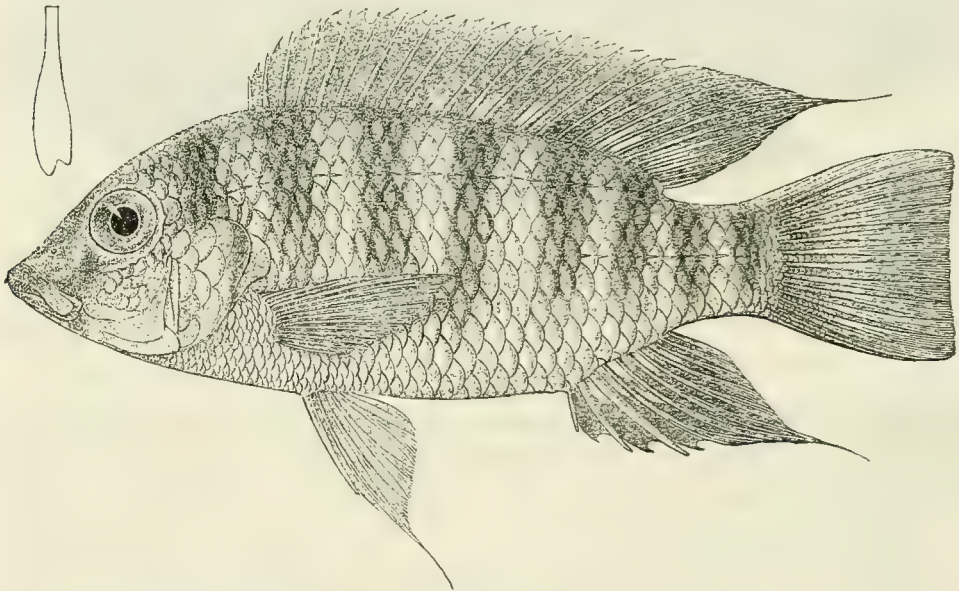


## 33. TILAPIA BREVIMANUS.

Bouleng. Ann. & Mag. N. H. (8) viii. 1911, p. 57.

Depth of body  $2\frac{1}{2}$  to  $2\frac{3}{4}$  times in total length, length of head 3 times. Head twice as long as broad, upper profile convex; snout as long as broad, or a little broader, as long as or slightly longer than postorbital part of head; eye 3 to  $3\frac{1}{2}$  times in length of head, equal to interorbital width, and slightly exceeding depth of præorbital; mouth extending to between nostril and eye; outer teeth moderately large, 50 to 60 in upper jaw, followed after a rather wide interspace by 3 to 5 regular and

Fig. 125.



*Tilapia brevimanus.*

Type.

well-separated series of smaller teeth; 3 or 4 series of scales on the cheek, the vertical diameter of the scaly part below the eye  $\frac{3}{5}$  to  $\frac{2}{3}$  diameter of latter. Gill-rakers short, 13–15 on lower part of anterior arch. Dorsal XVI (rarely XVII) 12; spines increasing in length to the last, which measures about  $\frac{3}{5}$  length of head; soft portion pointed, produced into a long filament in the male. Anal III 8–9; third spine as long as last dorsal. Pectoral  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head, not reaching vertical of origin of anal. Ventral produced into a long filament, reaching vent or anal. Caudal truncate. Caudal peduncle nearly as long as deep.

Scales not denticulate, 30–32  $\frac{2\frac{1}{2}-3\frac{1}{2}}{11-12}$ ; lateral lines  $\frac{21-22}{11-12}$ . Yellowish olive above, whitish beneath; 8 or 9 dark brown cross-bands on the head and back, not descending to the belly, the first between the eyes; fins olive, dorsal and anal with yellowish spots at the base; a dark basal spot at the origin of the soft dorsal.

Total length 130 millim.

Portuguese Guinea.

1–6. Types.	Geba R. at Bafata.	Dr. W. J. Ansorge (C.).
7–9. Ad.	Culufi R. above Bafata.	„

#### 34. TILAPIA ZILLII.

*Acerina zillii*, Gerv. Ann. Sc. Nat. (3) x. 1848, p. 203.

*Coptodon zillii*, Gerv. Bull. Soc. Agric. Hérault, 1853, p. 80, pl. iv. figs. 5–7;

A. Dum. Arch. Mus. x. 1859, p. 252.

*Glyphisodon zillii*, Val. C.R. Ac. Sc. xlv. 1858, p. 713.

*Haligenes tristrami*, Günth. Proc. Zool. Soc. 1859, p. 471, pl. ix. fig. B.

*Chromis tristrami*, part., Günth. Cat. Fish. iv. p. 269 (1862).

*Sarotherodon? zillii*, Günth. t. c. p. 274.

*Chromis andreæ*, Günth. Proc. Zool. Soc. 1864, p. 492; Lortet, Ann. Mus. Lyon, iii. 1883, p. 142, pl. viii. fig. 3; Tristr. Faun. Palest. pl. xvii. fig. 1 (1884).

*Chromis niloticus*, part., Gerv. Zool. Pal. Gén. p. 205, pl. xlv. fig. 3 (1869), and Journ. de Zool. iii. 1874, p. 455.

*Chromis mossambicus*, part., Steind. Sitzb. Ak. Wien, lx. i. 1870, p. 23.

*Chromis zillii*, Sauv. Bull. Soc. Philom. (7) i. 1877, p. 163; Rolland, Rev. Scientif. (4) ii. 1894, p. 418, fig.

*Chromis menzalensis*, J. C. Mitch. Rep. Fish. L. Menzaleh, p. 13, pl. iii. (1895).

*Chromis tristrami*, Günth. Proc. Zool. Soc. 1896, p. 218.

*Tilapia tristrami*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 6.

*Tilapia menzalensis*, Bouleng. Proc. Zool. Soc. 1899, p. 119.

*Tilapia zillii*, Bouleng. l. c.; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 327; Bouleng. Fish. Nile, p. 519, pl. xcii. (1907).

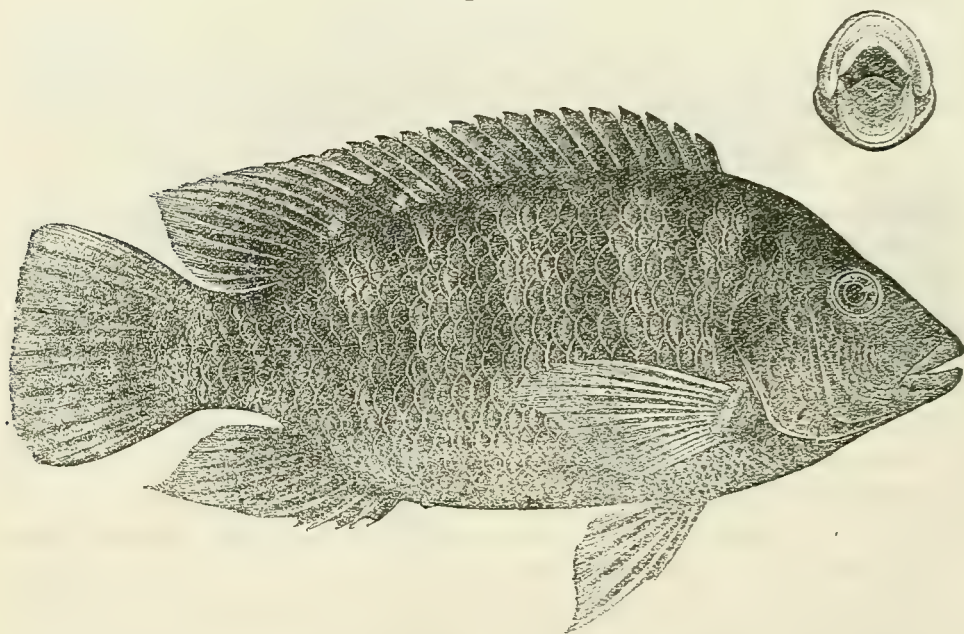
*Chromis busumanus*, Günth. Proc. Zool. Soc. 1902, ii. p. 333, pl. xxx.

*Tilapia busumana*, Peilegr. t. c. p. 332.

Depth of body  $2\frac{1}{6}$  to  $2\frac{2}{3}$  times in total length, length of head  $2\frac{2}{3}$  to  $3\frac{1}{3}$  times. Head  $1\frac{2}{3}$  to 2 times as long as broad; snout with straight or slightly concave upper profile, a little broader than long, as long as or a little shorter than postorbital part of head; eye  $3\frac{1}{2}$  (young) to 5 times in length of head, 1 (young) to 2 times in interorbital width, less than præorbital depth in adult; mouth usually rather large,  $\frac{3}{5}$  to  $\frac{4}{5}$  width of

head, extending to below anterior border of eye, or to between nostril and eye; teeth in 3 to 6 more or less regular series, outer largest, 20 (young) to 60 in upper jaw, and separated from the others by a rather wide interspace; 3 or 4 series of scales on the cheek, width of scaly part equal to or greater than diameter of eye in adult. Gill-rakers short, 8-11 on lower part of anterior arch. Dorsal XIV-XVI 10-13; last spine longest,  $\frac{2}{5}$  to  $\frac{3}{5}$  length of head; middle soft rays more or less produced in adult, usually as long as head. Anal III 7-10 (usually 8-9); third spine usually shorter than longest dorsal. Pectoral as long

Fig. 126.

*Tilapia zillii.*L. Menzaleh (F. N.).  $\frac{3}{8}$ .

as head or a little shorter, rarely slightly longer, rarely extending to vertical of origin of anal. Ventral usually reaching vent or anal. Caudal truncate or rounded-subtruncate, rounded in old specimens. Caudal peduncle as long as deep or a little deeper than long. Scales cycloid or very feebly denticulate, 28-33  $\frac{3-3\frac{1}{2}}{11-15}$ ; lateral lines  $\frac{17-22}{11-15}$ . Dark green, olive, or brown, usually with 6 to 8 more or less distinct dark cross-bars, with or without a dark stripe along the middle of the side; a black opercular spot; sometimes a dark vertical bar below the eye; vertical fins with dark markings, which often form oblique streaks on



the dorsal and anal fins, and may form a network on the caudal fin; a black spot on the base of the anterior soft dorsal rays; caudal fin often dark, with or without round whitish spots; in life, the lower parts often of a dark blood-red.

Total length 290 millim.

Lake Galilee, Algerian Sahara, and Lower Egypt, to the Bahr-el-Gebel, the Victoria Nile, Lakes Rudolf and Gandjule (Margherita), Chad Basin, Niger, Gold Coast.—Types in Paris Museum.

1-2. Yg.	Near Biskra, Algerian Sahara.	W. J. Harding King, Esq. (P.).
3-5. Yg.	Oumach, „	R. Gurney, Esq. (P.).
6-7. Types of <i>Chromis tris-trami</i> .	Tuggurt, „	Canon Tristram (C.).
8-9. Yg.	„ „	Dr. F. Werner (P.).
10-11. Hgr. :	Wed Rir, „	M. Jus (C.) ; Paris Museum (E.).
12-21. Ad. & hgr.	L. Mareotis.	L. Loat, Esq. (C.).
22-25. Yg.	Near Alexandria.	C. H. Schoeller, Esq. (P.).
26-27. Ad.	L. Borollos.	L. Loat, Esq. (C.).
28-33. Types of <i>Chromis menzalensis</i> .	L. Menzaleh.	Dr. J. C. Mitchell (P.).
34-63. Ad. & hgr.	„	L. Loat, Esq. (C.).
64. Skel.	„	„
65-72, 73-83. Ad., hgr., & yg.	Ghet-el-Nassara, near L. Menzaleh.	„
84. Yg.	Bahr-el-Tawilah, near L. Menzaleh.	„
85-100, 101-120. Ad., hgr., & yg.	Nile near Samannud.	„
121. Ad.	Nile at Cairo.	„
122-131. Ad. & yg.	Canal near Cairo.	„
132. Yg.	Zoological Gardens, Giza.	„
133. Ad.	Birket Karun, Fayoum.	Dr. W. A. Cunningham and Dr. C. L. Boulenger (P.).
134-143. Yg.	L. No, White Nile.	L. Loat, Esq. (C.).
144-147. Ad. & yg.	Gondokoro, Bahr-el-Gebel.	„
148. Ad.	Fajao, Victoria Nile.	J. S. Budgett, Esq. (P.).
149. Ad.	L. Rudolf.	Dr. Donaldson Smith (C.).



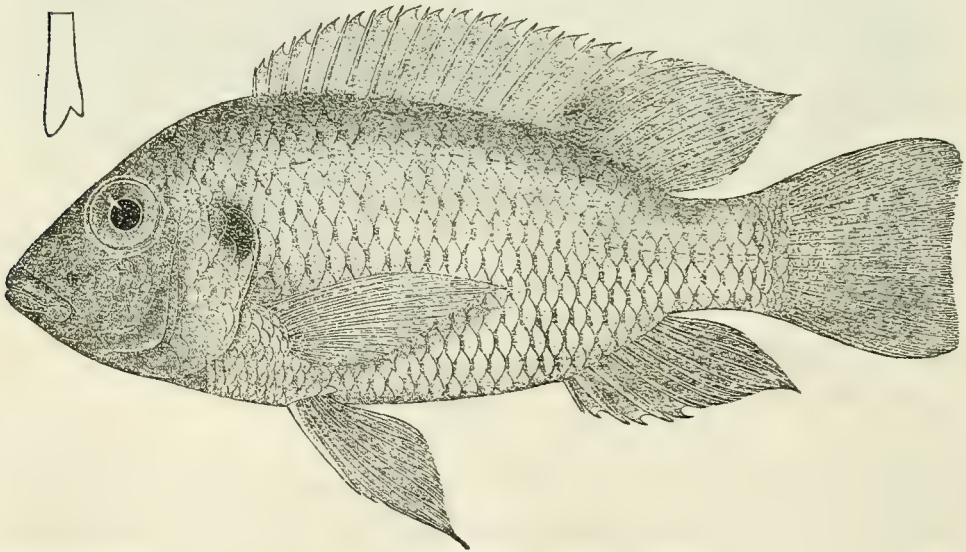
150. Yg.	Jebba, Upper Niger.	Capt. G. F. Abadie (P.).
151. Ad.	" "	C. H. Firmin, Esq. (P.).
152-153. Ad.	Mureji, "	J. S. Budgett, Esq. (P.).
154-158 Ad. &	Tano R., Gold Coast.	Dr. H. G. F. Spurrell (P.).
yg.		
159-163. Types of	L. Busum Chi, Gold Coast.	R. B. N. Walker, Esq. (C.) ;
<i>Chromis busu-</i>		Dr. A. Günther (P.).
<i>manus.</i>		
164. Skel.	" "	" "
165-167. Types of	L. Galilee. "	Canon Tristram (C.).
<i>Chromis andrea.</i>		

## 35. TILAPIA KOTTÆ.

Lönnb. Ann. & Mag. N. H. (7) xiii. 1904, p. 135.

Depth of body  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times in total length, length of head  $2\frac{2}{3}$  to 3 times. Head a little less than twice as long as broad; snout with straight upper profile, a little broader than long, as long as postorbital

Fig. 127.

*Tilapia kottæ.*

Type.

part of head; eye  $3\frac{1}{3}$  (young) to 4 times in length of head,  $1\frac{1}{4}$  to  $1\frac{1}{3}$  times in interorbital width, nearly equal to præorbital depth; mouth rather large,  $\frac{3}{4}$  to  $\frac{4}{5}$  width of head, extending to between nostril and eye or almost to below anterior border of eye; teeth in 3 or 4 series, outer

largest, 50 to 60 in upper jaw, and separated from the others by a rather wide interspace; 3 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 10 on lower part of anterior arch. Dorsal XV-XVI 11-12; last spine longest, about  $\frac{1}{2}$  length of head; middle soft rays about  $\frac{2}{3}$  length of head. Anal III 8; third spine shorter than longest dorsal. Pectoral slightly shorter than head, not extending to vertical of origin of anal. Ventral reaching vent or anal. Caudal truncate. Caudal peduncle as long as deep. Scales 26-29  $\frac{2\frac{1}{2}}{10-11}$ ; lateral lines  $\frac{19-20}{11-13}$ . Males brownish above and black or blackish beneath, females whitish beneath; faint traces of four or five dusky bars sometimes present on the body; a black opercular spot; soft dorsal with a large basal black spot, with or without roundish light spots, which may also be present on the upper half of the caudal.

Total length 140 millim.

Barombi-ba-kotta, a small isolated lake of volcanic origin on the Cameroon Mountain.—Types in Stockholm Museum.

1-2. Two of the L. Barombi-ba-kotta.  
types.

Dr. G. Linnell (C.);  
Prof. E. Lönnberg (P.).

### 36. TILAPIA GUINEENSIS.

*Chromis guineensis* (Bleek.), Günth. Cat. Fish. iv. pp. 271 & 510 (1862).

*Chromis tristrami*, part., Günth. t. c. p. 269.

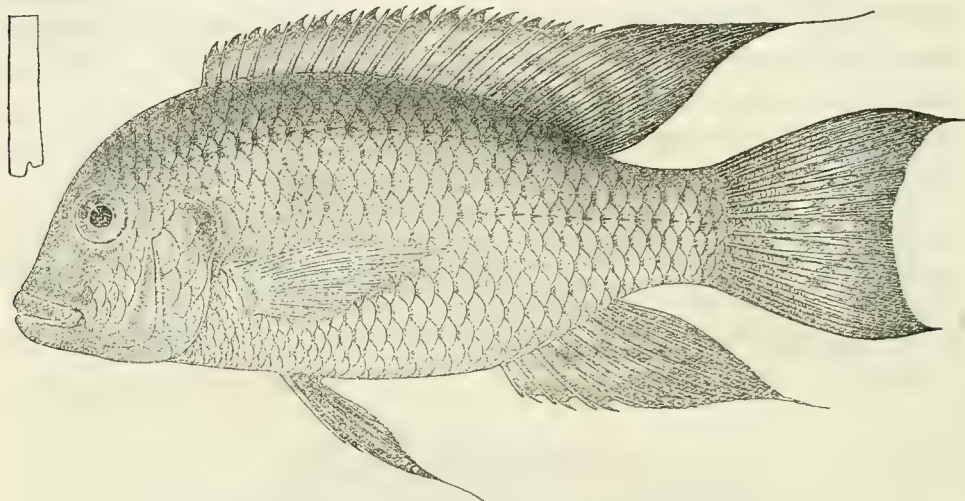
*Haligenes guineensis*, Bleek. Nat. Verh. Vet. Haarlem, xviii. 1863, no. 2, p. 41, pl. vii.

*Tilapia guineensis*, Bouleng. Proc. Zool. Soc. 1899, p. 124; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 333.

Depth of body  $2\frac{1}{3}$  to  $2\frac{3}{4}$  times in total length, length of head  $3\frac{1}{5}$  to  $3\frac{1}{3}$  times. Head twice as long as broad; snout deep, with steep upper profile, a little broader than long,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as eye, shorter than postocular part of head; eye 4 times in length of head,  $1\frac{1}{3}$  times in interorbital width, equal to or a little less than depth of præorbital; mouth rather large,  $\frac{2}{3}$  to  $\frac{3}{4}$  width of head, extending to below anterior border of eye or not quite so far; teeth in 4 series, outer largest, about 50 in upper jaw, and separated from the others by a rather wide interspace; 4 series of scales on the cheek, width of scaly part at least equal to diameter of eye. Gill-rakers short, 11 or 12 on lower part of anterior arch. Dorsal XV-XVI 11-13; last spine longest,  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head; middle soft rays much produced, much longer than head. Anal III 9; third spine shorter than longest dorsal, soft rays produced

like the dorsal. Pectoral a little longer than head, not extending quite to vertical of origin of anal. Ventral produced, reaching origin of anal or beyond. Caudal feebly emarginate, the outer rays somewhat produced. Caudal peduncle as long as deep or a little deeper than long. Scales cycloid,  $30-31 \frac{3}{10-11}$ ; lateral lines  $\frac{21-22}{12-14}$ . Dark olive; vertical fins with some light spots, which may be confluent into two or three streaks

Fig. 128.

*Tilapia guineensis.*Type.  $\frac{2}{3}$ .

on the dorsal; the extremity of the fins blackish; a black opercular spot.

Total length 190 millim.

Ashantee.

- |          |   |
|----------|---|
| 1. Type. | Ashantee.   |
| 2. Ad.   | Sacred Lake, Bucumachi, near C. Beddington, Esq. (P.).<br>Kumasi R. |

### 37. TILAPIA THOLLONI.

*Chromis tholloni*, Sauv. Bull. Soc. Zool. France, 1884, p. 196, pl. v. fig. 1.

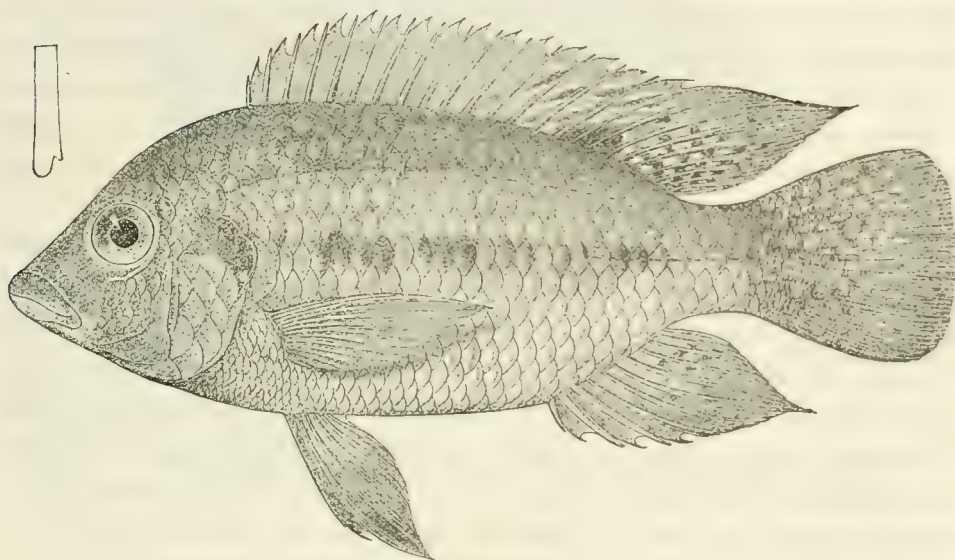
*Tilapia tholloni*, Bouleng. Proc. Zool. Soc. 1899, p. 121, and Poiss. Bass. Congo, p. 468 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 324.

Depth of body  $2\frac{2}{5}$  to  $2\frac{3}{5}$  times in total length, length of head 3 times. Head nearly twice as long as broad; snout with straight upper profile, a little broader than long, as long as postocular part of head; eye  $3\frac{3}{4}$  to 4 times in length of head,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times in interorbital width, equal to



præorbital depth; mouth about  $\frac{3}{4}$  width of head, extending to between nostril and eye; teeth in 4 or 5 series, outer largest, 60 to 70 in upper jaw, and separated from the others by a rather wide interspace; 3 or 4 series of scales on the cheek, width of scaly part not greater than diameter of eye. Gill-rakers short, 10 on lower part of anterior arch. Dorsal XV-XVI 8-10; last spine longest,  $\frac{1}{2}$  length of head; longest soft rays

Fig. 129.

*Tilapia tholloni.*Type.  $\frac{5}{6}$ .

nearly as long as head. Anal III 8-9; third spine a little shorter than last dorsal. Pectoral as long as head, reaching vertical of origin of anal, or not quite so far. Ventral not reaching anal. Caudal rounded, scaled nearly all over. Caudal peduncle as long as deep or a little deeper than long. Scales cycloid, 29-30  $\frac{3}{11-12}$ ; lateral lines  $\frac{19-21}{9-10}$ . Olive; a black opercular spot continued as a more or less interrupted dark band along the side of the body; rather indistinct dark cross-bars may be present on the body; dorsal with dark and light streaks and a blackish spot at the base of the origin of the soft dorsal; caudal with round light spots in a dark network.

Total length 180 millim.

Upper Ogowe, Chiloango, Lower Congo.—Types in Paris Museum.

- |        |                                    |                          |
|--------|------------------------------------|--------------------------|
| 1. Ad. | Kalombo-Songo Lagoon, Chiloango R. | Major Cabra (C.).        |
| 2. Ad. | Boma, Lower Congo.                 | Mr. J. Paul Arnold (P.). |



38. *TILAPIA CHRISTYI*, sp. n.

Depth of body  $2\frac{1}{4}$  to  $2\frac{1}{3}$  times in total length, length of head  $3\frac{1}{3}$  to  $3\frac{2}{5}$  times. Head nearly twice as long as broad; snout with convex upper profile, a little broader than long, as long as or a little shorter than postocular part of head; eye 4 times in length of head,  $1\frac{2}{3}$  times in interorbital width, equal to præorbital depth; mouth  $\frac{2}{3}$  width of head, extending to between nostril and eye; teeth in 4 series, outer largest, 40 to 50 in upper jaw, and separated from the others by a rather wide interspace; 3 or 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers very short, 9 or 10 on lower part of anterior arch. Dorsal XVI–XVII 12–13; last spine longest,  $\frac{1}{2}$  length of head; longest soft rays  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head. Anal III 9–10; third spine nearly  $\frac{1}{3}$  or  $\frac{2}{5}$  length of head. Pectoral as long as or a little longer than head, not reaching vertical of origin of anal. Ventral produced into a filament, not reaching origin of anal. Caudal rounded, scaled nearly all over. Caudal peduncle much deeper than long. Scales cycloid, 30–31  $\frac{3-3\frac{1}{2}}{11-12}$ ; lateral lines  $\frac{21-23}{10-14}$ . Brownish; the scales on the sides dark brown or blackish at the base; six rather indistinct dark cross-bars on the body; a black opercular spot; spinous dorsal with large brown spots; a large black spot at the base of the anterior rays of the soft dorsal, followed by blackish spots forming oblique streaks or a network; caudal with round light spots in a brown network.

Total length 180 millim.

Upper Congo.—Types in Congo Museum, Tervueren.

1. One of the types. Stanley Falls. Dr. C. Christy (C.).

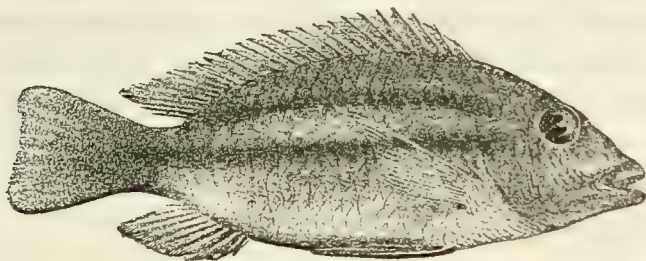
39. *TILAPIA BILINEATA*.

Pellegr. Bull. Mus. Paris, 1900, p. 276; Bouleng. Poiss. Bass. Congo, p. 470 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 325, pl. v. fig. 1.

Depth of body  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times in total length, length of head 3 to  $3\frac{1}{2}$  times. Snout with slightly convex upper profile,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as eye, as long as or a little shorter than postocular part of head; eye  $3\frac{1}{2}$  to 4 times in length of head, a little less than interorbital width; mouth  $\frac{2}{3}$  width of head, extending to between nostril and eye; teeth in 4 to 6 series, outer largest, 50 to 78 in upper jaw; 3 or 4 series of scales on the cheek. Gill-rakers short, 10 on lower part of anterior arch.

Dorsal XVII–XVIII 9–10 ; spines subequal from the fifth,  $\frac{2}{3}$  to  $\frac{1}{2}$  length of head. Anal III 7 ; third spine a little longer than longest dorsal. Pectoral  $\frac{3}{4}$  length of head, not reaching vertical of origin of anal. Ventral not reaching vent. Caudal rounded, feebly emarginate, covered

Fig. 130.

*Tilapia bilineata.*

Type, after Pellegrin (Mém. Soc. Zool. France, 1904).  $\frac{5}{8}$ .

with scales. Caudal peduncle slightly deeper than long. Scales cycloid, 30–32  $\frac{2\frac{1}{2}}{10}$  ; lateral lines  $\frac{21-22}{12}$ . Brown above, yellowish beneath ; two black lateral bands, corresponding to the two lateral lines.

Total length 180 millim.

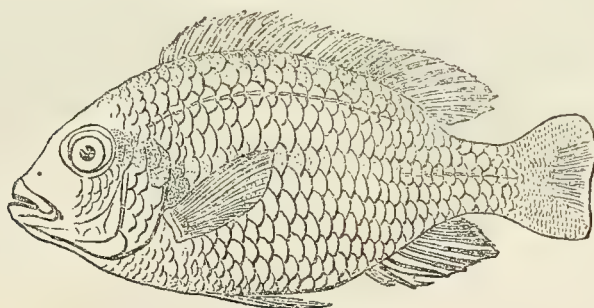
Alima R., Upper Congo.—Types, in Paris Museum, examined.

#### 40. TILAPIA CRASSA.

Pellegr. Bull. Mus. Paris, 1903, p. 120, and Mém. Soc. Zool. France, xvi. 1904, p. 324, fig.

Depth of body twice in total length, length of head 3 times. Snout

Fig. 131.

*Tilapia crassa.*

Type, after Pellegrin (Mém. Soc. Zool. France, 1904).  $\frac{1}{2}$ .

with slightly concave upper profile, as long as eye, a little longer than

postocular part of head; eye  $3\frac{1}{2}$  times in length of head, a little less than interorbital width; mouth extending to between nostril and eye; teeth very small, in 5 series; 3 series of scales on the cheek. Gill-rakers short, 11 on lower part of anterior arch. Dorsal XVII 9; spines equal from the fifth,  $\frac{1}{3}$  length of head. Anal III 7; third spine longer than longest dorsal. Pectoral  $\frac{3}{4}$  length of head, not reaching vertical of origin of anal. Caudal rounded, slightly emarginate, covered with scales. Caudal peduncle nearly as long as deep. Scales cycloid,  $29\frac{2\frac{1}{2}}{10}$ ; lateral lines  $\frac{20}{10}$ . Olive; an ill-defined dark spot behind the eye and another at the base of the origin of the soft dorsal.

Total length 170 millim.

Alima R., Upper Congo.—Type in Paris Museum.

#### 41. TILAPIA SPARRMANI.

A. Smith, Ill. Zool. S. Afr., Fish. pl. v. (1840); Bouleng. Proc. Zool. Soc. 1899, p. 119, and Poiss. Bass. Congo, p. 462 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 319; Bouleng. Tr. Zool. Soc. xviii. 1911, p. 417.

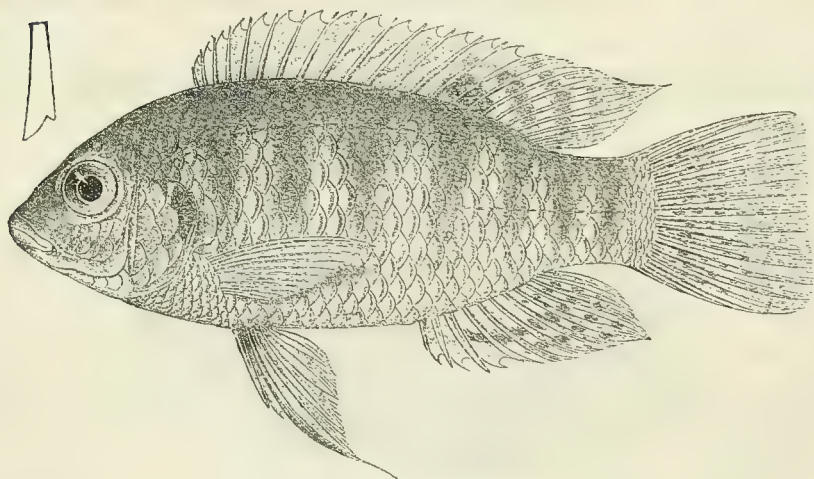
*Chromis sparrmanni*, Günth. Cat. Fish. iv. p. 269 (1862).

*Chromis niloticus*, part., Peters, Reise Mossamb. iv. p. 23 (1868).

*Tilapia fouloni*, Bouleng. Ann. & Mag. N. H. (7) xvi. 1905, p. 647.

Depth of body 2 to  $2\frac{3}{5}$  times in total length, length of head 3 to  $3\frac{1}{2}$

Fig. 132.



*Tilapia sparrmani*.

Type.

times. Head  $1\frac{2}{3}$  to  $1\frac{4}{5}$  times as long as broad; snout with straight or slightly convex or slightly concave upper profile, broader than long, as



long as or longer than eye, a little shorter than postocular part of head, eye 3 (young) to  $4\frac{1}{2}$  times in length of head,  $\frac{3}{5}$  to  $\frac{4}{5}$  interorbital width, equal to or a little more than depth of præorbital; mouth moderate,  $\frac{3}{5}$  to  $\frac{2}{3}$  width of head, extending to between nostril and eye, or nearly to below anterior border of latter; teeth small, in 3 to 6 series, 40 (young) to 80 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly portion less than diameter of eye. Gill-rakers short, 9 to 12 on lower part of anterior arch. Dorsal XIII–XV 9–11 (very rarely 12); last spine longest,  $\frac{2}{5}$  to  $\frac{3}{5}$  length of head; longest soft rays  $\frac{3}{4}$  to once length of head. Anal III 9–10; third spine a little shorter but stronger than last dorsal. Pectoral a little shorter than head, rarely just as long, not reaching vertical of origin of anal. Ventral reaching origin of anal or beyond. Caudal rounded or rounded-subtruncate. Caudal peduncle as long as deep or a little deeper than long. Scales cycloid, 27–29  $\frac{2\frac{1}{2}-3\frac{1}{2}}{9-10}$ ; lateral lines  $\frac{15-20}{8-16}$ . Pinkish brown to dark olive-brown, the scales sometimes with greenish-yellow margins; young with seven to nine dark bars, which may persist, though feebly marked, in the adult; a blue-black opercular spot; vertical fins with or without yellow edge, with small dark spots, or dorsal and anal with oblique darker and lighter stripes; a large blackish spot often present at the base of the soft dorsal, between the anterior rays; outer ventral rays usually black.

Total length 190 millim.

Angola, Katanga, Lakes Mweru and Bangwelu, and Zambesi to Orange River and Natal.

1–3. Ad. & yg.	Fluilla, Angola.	Dr. Welwitsch (P.).
4. Yg.	Que R., „	Dr. W. J. Ansorge (C.).
5–6. Ad.	L. Pempere, Katanga.	Capt. Lemaire (C.).
7–8. Yg.	L. Dilolo, „	„
9. Ad.	Kafubo R., „	Dr. L. Stappers (C.).
10–11. Ad.	L. Mweru at Pakalulwa.	„
12–13. Yg.	„ Lukonzolwa.	„
14. Type of <i>T. fouloni</i> .	L. Bangwelu.	F. H. Melland, Esq., and Father Foulon (P.).
15–21. Ad. & yg.	„	F. H. Melland, Esq. (P.).
22. Hgr.	Kazungula, Upper Zambesi.	Rev. L. Jalla (C.); Turin Museum (P.).
23. Ad.	Mazoë, S. Rhodesia.	J. ff. Darling, Esq. (P.).
24–25. Hgr.	Umsitu R., Broken Hill, S. Rhodesia.	Rev. F. A. Rogers and E. C. Chubb, Esq. (P.).
26–27. Ad.	Okovango R., near L. Ngami.	R. B. Woosnam, Esq. (C.).



28-29. Types.	Namaqualand, N. of Orange R.	Sir A. Smith (P.).
30-32. Ad. & hgr.	Griqualand West.	S. African Museum (P.).
33-34. Yg.	Vredeford Road, Orange R. Colony.	Capt. Barrett Hamilton (P.).
35. Ad.	N. Transvaal.	Dr. J. D. F. Gilchrist (P.).
36. Ad.	Groot Olifants R., Transvaal.	Major G. E. Bruce (P.).
37. Skel.	" "	" "
38-40. Ad. & hgr.	Klein Olifants R., "	" "
41. Ad.	Klip R., "	Dr. J. D. F. Gilchrist (P.).
42-43. Ad.	Mooi R., Potchefstroom, Transvaal.	S. African Museum (P.).
44. Ad.	S.W. of Middelburg, Transvaal.	J. Pershouse, Esq. (P.).
45-46. Ad.	Crocodile R., Transvaal.	Hon. P. A. Methuen (P.).
47-51. Ad. & hgr.	Ngoyi Hills, Zululand.	Mr. C. Grant (C.) ; C. D. Rudd, Esq. (P.).
52-57. Ad.	Umfulosi Station, Zululand.	" "
58-60. Ad.	Indukuduku, "	Dr. E. Warren (P.).

## 42. TILAPIA OVALIS.

*Chromis ovalis*, Steind. Verh. zool.-bot. Ges. Wien, xvi. 1866, p. 761.

*Tilapia ovalis*, Bouleng. Proc. Zool. Soc. 1899, p. 119, and Poiss. Bass. Congo, p. 461 (1901) ; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 319.

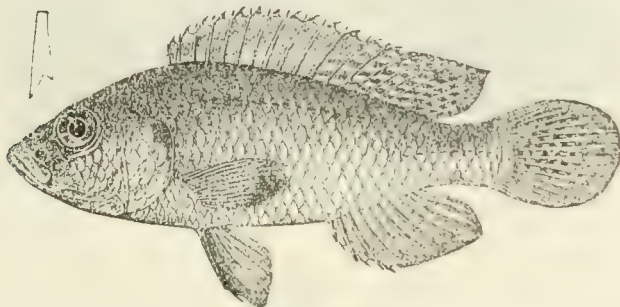
Depth of body equal to length of head,  $2\frac{2}{3}$  to 3 times in total length. Head twice as long as broad, upper profile straight or curved ; snout as long as broad, a little longer than eye, which is  $3\frac{1}{2}$  (young) to 4 times in length of head, and slightly exceeds interorbital width or præorbital depth ; mouth about  $\frac{1}{2}$  width of head, extending to below anterior border of eye ; teeth small, in 3 series, 40 to 50 in outer series of upper jaw ; 3 or 4 series of scales on the cheek, width of scaly part nearly equal to diameter of eye. Gill-rakers short, 7 to 9 on lower part of anterior arch. Dorsal XIII-XV 9-11 ; last spine longest,  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head ; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{5}$ . Anal III 8-9 ; third spine as long as last dorsal. Pectoral shorter than head, not extending to vertical of origin of anal. Ventral reaching vent or anal. Caudal rounded. Caudal peduncle as long as deep. Scales cycloid or very finely denticulate, 27-30  $\frac{2\frac{1}{2}-3}{10}$  ; lateral lines  $\frac{13-19}{1-10}$ . Olive-brown, with or without faint darker vertical bars ; a black opercular spot ; dorsal and anal edged with black,

and with dark and light spots, or with black streaks; outer ventral rays black or blackish.

Total length 100 millim.

Angola, Bechuanaland, Rhodesia, Katanga, Lake Bangwelu.—Type in Vienna Museum.

Fig. 133.



*Tilapia ovalis.*  
L. Bangwelu.

1. Yg.	Chiringa, N.W. Rhodesia.	Franklin White, Esq. (P.).
2-3. Hgr.	Lofoi, Katanga.	Capt. Lemaire (C.).
4-5. Yg.	L. Dilolo, Katanga.	"
6-10. Ad., hgr., & yg.	L. Bangwelu.	F. H. Melland, Esq. (P.).

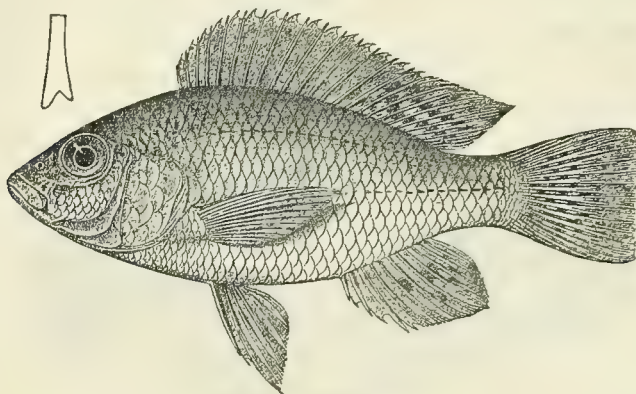
#### 43. TILAPIA STEINDACHNERI.

Bouleng. Ann. & Mag. N. H. (8) xii. 1913, p. 483.

Depth of body nearly equal to length of head,  $2\frac{1}{2}$  to 3 times in total length. Head a little more than twice as long as broad; snout with convex upper profile, as long as broad or a little longer than broad, as long as postocular part of head; eye  $3\frac{2}{3}$  (young) to  $4\frac{1}{2}$  times in length of head, equal to interorbital width or suborbital depth; mouth moderate, about  $\frac{2}{3}$  width of head, extending to between nostril and eye; teeth small, in 3 series, 40 to 60 in outer row of upper jaw; 4 series of scales on the cheek, width of scaly part equal to or a little less than diameter of eye. Gill-rakers short, 12 to 14 on lower part of anterior arch. Dorsal XIV-XV 12-13; spines equal in length from the sixth or seventh,  $\frac{1}{3}$  to not quite  $\frac{1}{2}$  length of head; longest soft rays about  $\frac{1}{2}$  length of head. Anal III 8-9; third spine as long as and stronger than last dorsal. Pectoral  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head, nearly reaching

vertical of origin of anal. Ventral reaching vent or anal. Caudal truncate. Caudal peduncle as long as or slightly longer than deep.

Fig. 134.

*Tilapia steindachneri.*

Type, Dongwenna Swamp.

Scales cycloid, 31-33  $\frac{3\frac{1}{2}-4}{11}$ ; lateral lines  $\frac{20-22}{12-16}$ . Brownish above, silvery white beneath; soft dorsal and caudal with small red spots.

Total length 125 millim.

Mossamedes.

1-4. Types.

Dongwenna Swamp.

Dr. W. J. Ansorge (C.).

5-9. Types.

Que R.

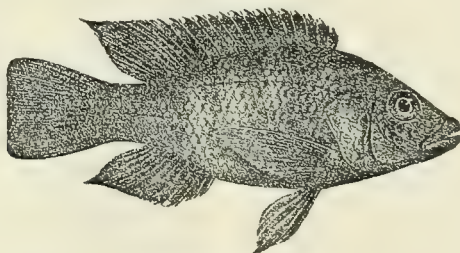
„

#### 44. TILAPIA PERCIVALI.

Bouleng. Proc. Zool. Soc. 1912, p. 676, pl. lxxix. fig. 3.

Depth of body equal to length of head,  $2\frac{1}{2}$  times in total length.

Fig. 135.

*Tilapia percivali.*

Type (P. Z. S. 1912).  $\frac{5}{6}$ .

Head about twice as long as broad; snout rounded, with straight or slightly convex upper profile, a little broader than long,  $\frac{3}{4}$  postocular

part of head; eye  $3\frac{1}{2}$  (young) to 4 times in length of head, greater than præorbital depth; mouth large,  $\frac{3}{4}$  width of head, extending to below anterior border of eye; lips very strongly developed; teeth moderately slender, in 3 or 4 series, 40 to 50 in outer series of upper jaw; 2 series of scales on the cheek, width of scaly part rather less than diameter of eye. Gill-rakers short, 13 or 14 on lower part of anterior arch. Dorsal XIII–XV 11; spines increasing in length to the last, which measures  $\frac{2}{3}$  length of head; longest soft rays  $\frac{2}{3}$  length of head. Anal III (exceptionally IV) 9–10; third spine  $\frac{1}{3}$  length of head. Pectoral about  $\frac{3}{4}$  length of head, usually not reaching origin of anal. Ventral reaching vent or anal. Caudal rounded, subtruncate. Caudal peduncle deeper than long. Scales cycloid, 30–31  $\frac{3-3\frac{1}{2}}{12}$ ; lateral lines  $\frac{18-20}{13-16}$ . Dark brown, with black vertical bars on the body, or entirely black.

Total length 75 millim.

Eusso Nyiro, East of Lake Baringo.

1–8. Types. Hot springs at Chandler Falls, A. Blayney Percival, Esq.  
N. Eusso Nyiro, 2500 ft. (P.).

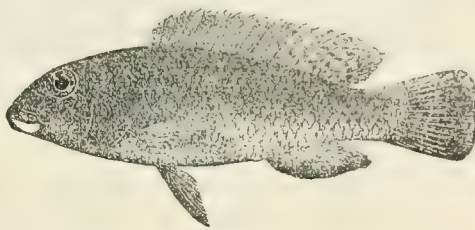
9. Skel. " " "

#### 45. TILAPIA GRAHAMI.

Bouleng. Ann. & Mag. N. H. (8) ix. 1912, p. 519.

Depth of body 3 to  $3\frac{1}{3}$  times in total length, length of head  $2\frac{1}{3}$  to  $2\frac{2}{3}$  times. Head large,  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times as long as broad; snout rounded,

Fig. 136.



*Tilapia grahami.*  
Type.

with convex upper profile, much broader than long,  $\frac{2}{3}$  to  $\frac{3}{4}$  postocular part of head; eye  $3\frac{1}{2}$  to  $4\frac{1}{2}$  times in length of head, a little greater than præorbital depth; mouth large,  $\frac{3}{4}$  width of head, extending to between vertical of nostril and anterior border of eye; lips very strongly developed, the lower forming a very distinct lobe on each side; teeth



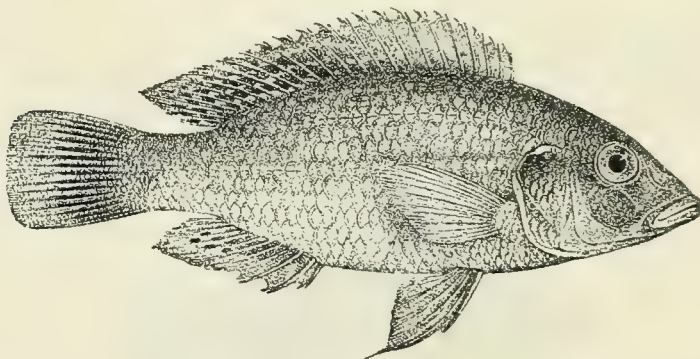
moderately slender, in 4 series, 30 to 34 in outer series of upper jaw; 3 series of scales on the cheek, width of scaly part nearly equal to diameter of eye. Gill-rakers short, 10 or 11 on lower part of anterior arch. Dorsal XI 11-12; spines feeble, subequal from the third, which measures  $\frac{1}{3}$  length of head. Anal III 8-9; spines feeble, like the dorsals. Pectoral  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head, not reaching origin of anal. Ventral not reaching vent. Caudal rounded. Caudal peduncle as long as deep. Scales cycloid, 28-30  $\frac{3}{11}$ ; lateral lines  $\frac{14-18}{6-11}$ ; breast and belly naked. Dark blue above, with more or less distinct, ill-defined, darker bars; sides with pale blue spots; dirty white beneath; lower labial lobe perfectly white; fins greyish, soft dorsal, anal, and caudal with numerous small darker spots which may form vertical bars on the caudal; the latter with the posterior edge of a faint pink.

Total length 60 millim.

Lake Magadi, a hot soda lake in bottom of Rift Valley, British East Africa, at an elevation of 1980 feet above sea-level.

1-5. Types.	L. Magadi.	J. W. Graham, Esq. (P.).
6-35. Ad., yg., & eggs.	„	C. W. Woodhouse, Esq. (P.).

Fig. 137.



*Tilapia woosnami.*

Type (Tr. Z. S. 1911).  $\frac{5}{6}$ .

#### 46. TILAPIA WOOSNAMI.

Bouleng. Tr. Zool. Soc. xviii. 1911, p. 417, pl. xliii. fig. 2.

Depth of body  $2\frac{3}{4}$  times in total length, length of head 3 times. Head twice as long as broad; snout obtusely pointed, as long as post-orbital part of head, as long as broad, with slightly convex upper profile; eye  $4\frac{1}{2}$  times in length of head, equal to width of interorbital region or depth of præorbital; mouth moderate,  $\frac{3}{5}$  width of head,

extending to between nostril and eye; teeth in outer row rather large, 36 in upper jaw, with an inner row of very minute teeth; 6 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers very short, 12 on lower part of anterior arch. Dorsal XV 13; spines equal in length from the seventh, which is  $\frac{2}{3}$  length of head; longest soft rays  $\frac{1}{2}$  length of head. Anal III 9; third spine nearly as long as longest dorsal. Pectoral  $\frac{2}{3}$  length of head, not reaching vertical of origin of anal. Ventral barely reaching vent. Caudal rounded. Caudal peduncle as long as deep. Scales with feebly denticulated border, 34  $\frac{3\frac{1}{2}}{10}$ ; lateral lines  $\frac{22}{16}$ . Brownish above, yellowish beneath; dorsal with round black spots between the soft rays.

Total length 110 millim.

Lake Ngami Basin.

1. Type. Okovango R. R. B. Woosnam, Esq. (C.).

#### 47. TILAPIA JALLÆ.

*Chromis jallæ*, Bouleng. Boll. Mus. Torin. xi. 1896, p. 260.

*Tilapia jallæ*, Bouleng. Proc. Zool. Soc. 1899, p. 123; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 329.

Depth of body  $3\frac{1}{2}$  times in total length, length of head  $3\frac{1}{4}$  times. Snout a little longer than eye, which is  $3\frac{1}{2}$  times in length of head and  $1\frac{1}{2}$  times interorbital width; mouth not extending to below anterior border of eye; teeth small; 6 or 7 series of scales on the cheek. Gill-rakers short, 9 on lower part of anterior arch. Dorsal XV 10; spines subequal from the fifth, which measures  $\frac{1}{2}$  length of head; last soft rays prolonged into filaments. Anal III 8; third spine as long as longest dorsal. Pectoral  $\frac{2}{3}$  length of head. Caudal truncate. Caudal peduncle  $1\frac{1}{2}$  times as long as deep. Scales cycloid, 33  $\frac{3}{8}$ ; lateral lines  $\frac{21}{13}$ . Olive-brown, with traces of five darker bars.

Total length 75 millim.

Upper Zambesi (district of the Victoria Falls).—Type in Turin Museum.

#### 48. TILAPIA HUMILIS.

*Chromis humilis*, Steind. Verh. zool.-bot. Ges. Wien, xvi. 1866, p. 763.

*Tilapia humilis*, Bouleng. Proc. Zool. Soc. 1899, p. 124; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 322.

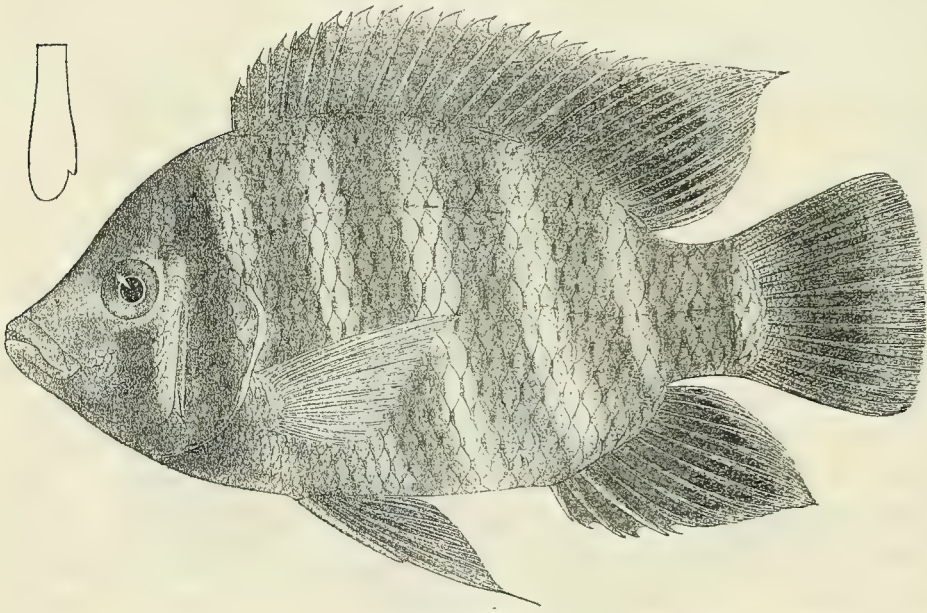
Depth of body  $3\frac{3}{5}$  times in total length, length of head  $3\frac{1}{5}$  times.

Snout with straight upper profile; eye  $4\frac{2}{5}$  times in length of head, equal to interorbital width; mouth not extending to below anterior border of eye; 6 or 7 series of scales on the cheek. Dorsal XV 10; last spine longest, about  $\frac{1}{3}$  length of head; longest soft rays not quite  $\frac{1}{2}$  length of head. Anal III 8. Pectoral  $\frac{3}{5}$  length of head. Caudal rounded. Scales  $30\frac{5}{12}$ ; lateral lines  $\frac{21}{14}$ . Yellowish brown; a black opercular spot; dorsal and caudal with round blackish spots.

Total length 115 millim.

Angola.—Type in Vienna Museum.

Fig. 138.



*Tilapia buettikoferi*.  
Type of *T. ansorgii*.  $\frac{1}{2}$ .

#### 49. TILAPIA BUETTIKOFERI.

*Chromis büttikoferi*, Hubrecht, Notes Leyd. Mus. iii. 1881, p. 66; Steind. op. cit. xvi. 1894, p. 39.

*Tilapia buettikoferi*, Bouleng. Proc. Zool. Soc. 1899, p. 128; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 322.

*Tilapia ansorgii*, Bouleng. Ann. & Mag. N. H. (8) vii. 1911, p. 376.

Depth of body 2 to  $2\frac{1}{4}$  in total length, length of head 3 to  $3\frac{2}{5}$  times. Head  $1\frac{3}{4}$  times as long as broad, upper profile slightly concave; snout as long as broad,  $1\frac{2}{3}$  times as long as eye in adult, as long as eye in young; eye 3 (young) to 4 times in length of head, 1 to  $1\frac{3}{4}$  times in



interorbital width, equal to depth of præorbital; mouth extending to between nostril and eye, extremity of maxillary exposed; outer teeth in both jaws large, obtusely bilobed, 20 (young) to 38 in upper jaw, followed after a wide interspace by a few minute tricuspid teeth arranged in 2 or 3 transverse series; 5 or 6 series of scales on the cheek, the vertical diameter of the scaly part below the eye equal to diameter of latter. Gill-rakers rather short, the larger anvil-shaped, 11 or 12 on lower part of anterior arch. Dorsal XIV–XV 14–16; spines increasing in length to the last, which measures  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head; longest soft ray  $\frac{3}{4}$  to  $\frac{5}{6}$  length of head. Anal III 10–11; third spine longest, stronger but shorter than longest dorsal. Pectoral as long as or a little shorter than head, not reaching vertical of origin of anal. Ventral produced into a long filament, reaching origin of anal or beyond. Caudal rounded, scaly all over in the adult. Caudal peduncle deeper than long. Scales not or but very feebly denticulate, 29–32  $\frac{3\frac{1}{2}-4\frac{1}{2}}{11-12}$ ; lateral lines  $\frac{19-22}{9-13}$ . Grey or brown, with seven or eight broad black vertical bars descending to the mid-ventral line, the first passing through the eye, the last on the caudal peduncle; pectoral greyish, other fins blackish.

Total length 210 millim.

Liberia and Portuguese Guinea.—Types in Leyden Museum.

1–7. Types of <i>T. ansorgii</i> .	Culufi R. above Bafata, Portuguese Guinea.	Dr. W. J. Ansorge (C.).
8–10. „	Geba R. at Bafata, Portu- guese Guinea.	„
11. Skel.	„ „	„
12–14. Hgr. & yg.	Gam Besse, Corbal R., Portuguese Guinea.	„

#### 50. TILAPIA FASCIATA.

*Chromis fasciatus*, Perugia, Ann. Mus. Genova, (2) x. 1892, p. 970.

*Tilapia monteiri*, Bouleng. Proc. Zool. Soc. 1899, p. 133.

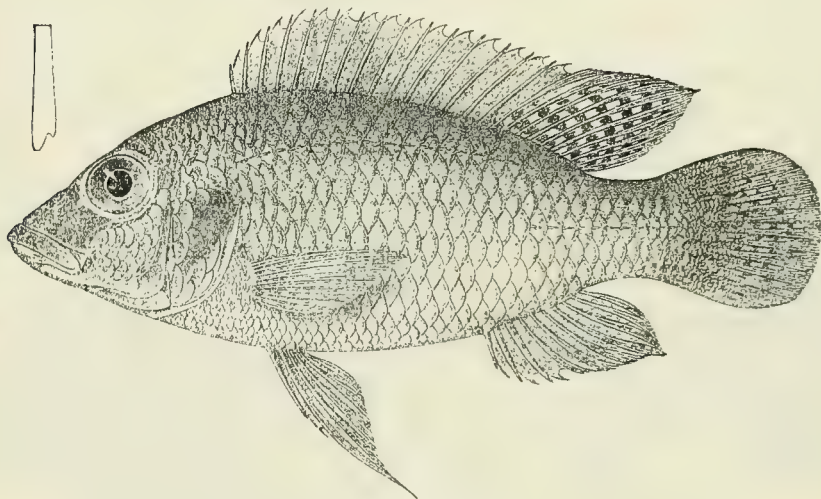
*Tilapia fasciata*, Bouleng. l. c., and Poiss. Bass. Congo, p. 465 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 339.

Depth of body equal to length of head,  $2\frac{1}{2}$  to 3 times in total length. Head twice as long as broad; snout with straight upper profile, as long as broad, as long as postocular part of head, as long as or a little longer than eye, which is 3 to  $3\frac{1}{2}$  times in length of head, slightly exceeds interorbital width, and considerably exceeds depth of præorbital; mouth rather large,  $\frac{2}{3}$  to  $\frac{3}{4}$  width of head, extending to below anterior border



of eye or a little beyond in the adult; maxillary exposed; teeth in 3 to 5 series, outer largest, 40 to 60 in upper jaw; 3 to 5 series of scales on the cheek, width of scaly part nearly equal to diameter of eye. Gill-rakers short, 10 to 12 on lower part of anterior arch. Dorsal XIV-XV 10-11; spines equal from the fourth or fifth, about  $\frac{1}{3}$  length of head,  $\frac{1}{2}$  as long as longest soft rays. Anal III 6-7; third spine as long as and thicker than dorsals. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not reaching vertical of origin of anal. Ventral reaching origin of anal. Caudal

Fig. 139.



*Tilapia fasciata.*  
Matadi (tail restored).

rounded, densely scaled at the base. Caudal peduncle as long as deep or a little deeper than long. Scales with finely denticulate edge, 29-30  $\frac{3-4}{12}$ ; lateral lines  $\frac{19-21}{11-14}$ . Brownish, young with numerous, rather indistinct darker vertical bars; soft dorsal with oblique dark streaks.

Total length 105 millim.

Lower Congo.—Types in Genoa Museum.

1-6. Yg., types.	Vivi.	Capt. G. Bove (C.); Genoa Museum (P.).
7. Type of <i>T. monteiri</i> .	Boma.	J. J. Monteiro, Esq. (C.).
8. Ad.	Matadi.	Dr. Jackson (C.); Hon. W. Rothschild (P.).
9-11. Hgr. & yg.	Near Leopoldville.	Drs. Dutton, Christy, and Todd (P.).
12-14. Hgr. & yg.	Kinshassa, Stanley Pool.	Mr. A. Greshoff (C.); Utrecht University (E.).

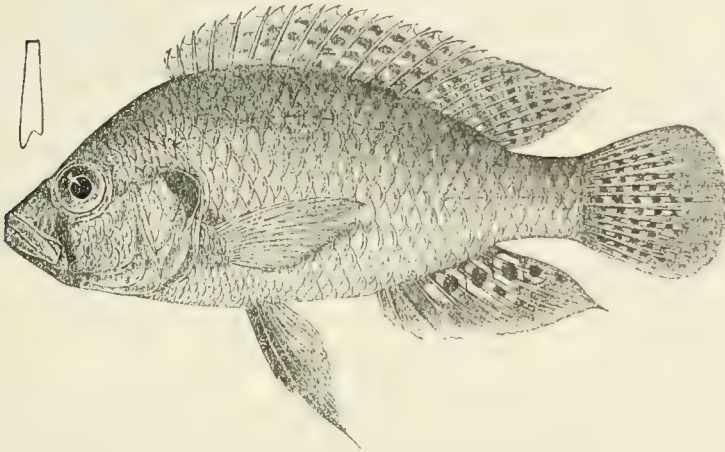
## 51. TILAPIA BURTONI.

*Chromis burtoni*, Günth. Proc. Zool. Soc. 1893, p. 631, pl. lviii. fig. C.

*Tilapia burtoni*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 5, Proc. Zool. Soc. 1899, p. 127, and Poiss. Bass. Congo, p. 460 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 320.

Depth of body  $2\frac{1}{3}$  to  $2\frac{4}{5}$  times in total length, length of head  $2\frac{2}{3}$  to  $3\frac{1}{5}$  times. Head 2 to  $2\frac{1}{4}$  times as long as broad; snout with straight or slightly concave upper profile, as long as or a little shorter than

Fig. 140.



*Tilapia burtoni*.  
Kitutu.

broad, much shorter than postocular part of head, 1 to  $1\frac{1}{3}$  times as long as eye, which is  $3\frac{1}{3}$  (young) to 4 times in length of head, equals inter-orbital width, and exceeds least depth of præorbital; mouth rather large,  $\frac{2}{3}$  to  $\frac{3}{4}$  width of head, extending to below anterior border of eye or a little beyond; maxillary exposed; teeth small, in 4 to 6 series close together, 50 (young) to 70 in outer series of upper jaw; 3 to 5 series of scales on the cheek. Gill-rakers short, 9 or 10 on lower part of anterior arch. Dorsal XIV-XV 9-11; spines increasing in length to the tenth or last, which measures  $\frac{1}{3}$  to  $\frac{1}{2}$  length of head; longest soft rays about  $\frac{2}{3}$  length of head. Anal III 8-9; third spine as long as or a little shorter than longest dorsal. Pectoral  $\frac{2}{3}$  to  $\frac{4}{5}$  length of head, reaching or not vertical of origin of anal. Ventral somewhat produced, extending to origin of anal or beyond. Caudal rounded or rounded-subtruncate. Caudal peduncle as long as or a little longer than deep. Scales more or less distinctly denticulate, 28-31  $\frac{3-3\frac{1}{2}}{11}$ ; lateral lines  $\frac{18-21}{8-12}$ .

Brown or olive above, whitish beneath, often with two dark bars across the snout and another below the anterior third of the eye; border of lower jaw and lower limb of præoperculum sometimes dark brown; sometimes a dark band on the side of the head behind the eye; opercular spot more or less distinct, or absent; dorsal and caudal usually with numerous small dark spots, the former sometimes edged with blackish; a series of large bright ocellar spots often present on the anal.

Total length 95 millim.

Lakes Tanganyika and Kivu.

1. Type.	Ujiji, L. Tanganyika.	E. Coode Hore, Esq. (C.).
2-11. Ad., hgr., & yg.	Kitutu, "	Dr. W. A. Cunningham (C.).
12-13, 14-15. Hgr. & yg.	Mtondwe Bay, "	"
16-17. Hgr.	Lufuko R., "	Dr. L. Stappers (C.).
18-22. Yg.	Pond at Tembwe, "	"
	L. Tanganyika.	
23-32. Ad. & hgr.	L. Kivu.	Prof. J. E. S. Moore (C.).
33. Skel.	"	"

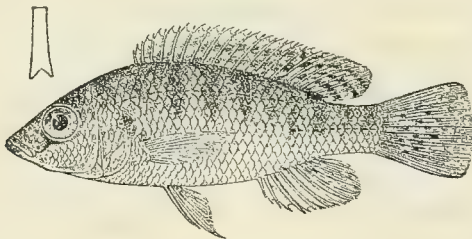
## 52. TILAPIA ACUTICEPS.

*Chromis acuticeps*, Steind. Verh. zool.-bot. Ges. Wien, xvi. 1866, p. 764; Bouleng. Boll. Mus. Torin. xi. 1896, no. 260.

*Tilapia acuticeps*, Bouleng. Proc. Zool. Soc. 1899, p. 134; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 340.

Depth of body equal to or a little less than length of head, about

Fig. 141.



*Tilapia acuticeps*.  
Luculla R.

3 times in total length. Head a little more than twice as long as broad; snout with straight upper profile, as long as broad, shorter than postocular part of head, a little longer than eye, which is  $3\frac{1}{2}$  to 4 times in length of head, equals interorbital width, and a little exceeds least

depth of præorbital; mouth moderate, about  $\frac{2}{3}$  width of head, extending to between nostril and eye; end of maxillary exposed; lower jaw slightly projecting; teeth small, in 2 series, about 50 in outer row of upper jaw; 4 or 5 series of scales on the cheek, width of scaly part equal to or a little less than diameter of eye. Gill-rakers short, 9 to 11 on lower part of anterior arch. Dorsal XIV–XV 10–11; last spine longest,  $\frac{2}{5}$  length of head, longest soft rays about  $\frac{1}{2}$ . Anal III 8–9; third spine as long as last dorsal. Pectoral about  $\frac{2}{3}$  length of head, not extending to vertical of origin of anal. Ventral reaching vent. Caudal rounded. Caudal peduncle as long as deep. Scales rather strongly denticulate, 30–32  $\frac{3\frac{1}{2}-4}{11}$ ; lateral lines  $\frac{18-22}{11-12}$ . Brownish, with several rather ill-defined dark bars; a black opercular spot; a dark bar from below the eye to the angle of the mouth; vertical fins with small spots, forming oblique streaks on the dorsal.

Total length 85 millim.

Angola and Upper Zambezi.

- |         |                                |
|---------|--------------------------------|
| 1. Hgr. | Luculla R. at Luculla, Angola. |
| 2. Hgr. | Kazungula, Upp. Zambesi.       |

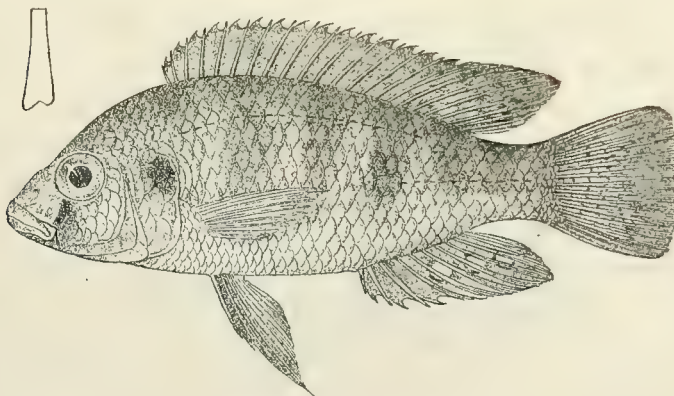
Dr. W. J. Ansorge (C.).  
Rev. L. Jalla (C.);  
Turin Museum (P.).

### 53. TILAPIA SWYNNERTONI.

Bouleng. Ann. & Mag. N. H. (7) xx. 1907, p. 50.

Depth of body  $2\frac{1}{2}$  to  $2\frac{3}{5}$  times in total length, length of head 3 times.

Fig. 142.



*Tilapia swynnertoni*.

Type.

Head twice as long as broad; snout obtuse, with straight or convex upper profile, slightly broader than long, shorter than postocular part



of head, as long as eye, which is  $3\frac{1}{2}$  times in length of head, and a little exceeds interorbital width or least depth of præorbital; mouth moderate, about  $\frac{2}{3}$  width of head, extending to below anterior border of eye or a little beyond; end of maxillary exposed; lips rather thick; 3 series of tricuspid teeth and an outer series of rather large bicuspid teeth, 40 to 42 in upper jaw; 3 or 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 8 on lower part of anterior arch. Dorsal XV 9-10; spines increasing in length to the last, which measures nearly  $\frac{1}{2}$  length of head; longest soft rays  $\frac{2}{3}$  length of head. Anal III 8-9; third spine shorter than last dorsal. Pectoral barely  $\frac{3}{4}$  length of head, not extending to vertical of origin of anal. Ventral reaching origin of anal or a little beyond. Caudal rounded. Caudal peduncle as long as deep. Scales rather strongly denticulate, 29-31  $\frac{21-3}{10-11}$ ; lateral lines  $\frac{20-22}{10-11}$ . Dark olive-brown, with ill-defined black cross-bars; a black vertical bar below the anterior half of the eye, and a black opercular spot; fins grey; male with two to four round yellow dark-edged spots on the anal.

Total length 95 millim.

Buzi River, Portuguese East Africa.

1-3. Types.	Idunda R., flowing into Lower	C. M. F. Swynnerton, Esq.
	Buzi R.	(P.).

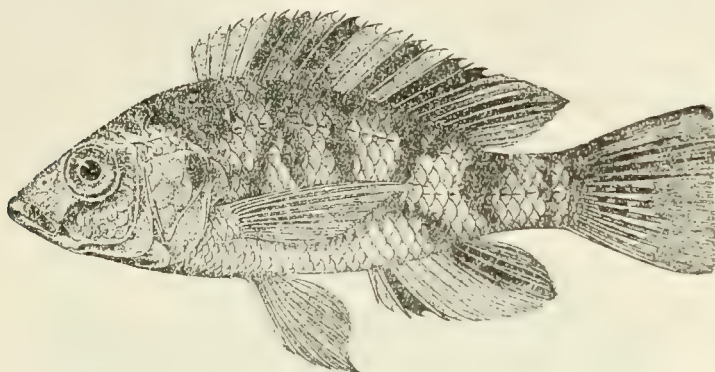
#### 54. TILAPIA ADOLPHI-FREDERICI.

Bouleng. in Schubotz, Wiss. Ergebn. Deutsch. Z.-Afr. Exped., Zool. iii. p. 254, pl. vi. (1914).

Depth of body equal to length of head,  $2\frac{4}{5}$  times in total length. Head  $2\frac{1}{2}$  times as long as broad; snout with slightly convex upper profile, as long as broad, much shorter than postocular part of head, as long as eye, which is  $3\frac{1}{2}$  times in length of head, equals interorbital width, and exceeds least depth of præorbital; mouth moderate,  $\frac{2}{3}$  width of head, extending to below anterior border of eye; teeth in 4 series, outer moderately large, 42 in upper jaw; 3 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, 7 on lower part of anterior arch. Dorsal XIV 10; spines increasing in length to the last, which measures nearly  $\frac{1}{2}$  length of head; longest soft rays  $\frac{3}{5}$  length of head. Anal III 9; third spine as long as last dorsal. Pectoral as long as head, reaching beyond vertical of origin of anal. Ventral somewhat produced, extending a little beyond origin of anal. Caudal truncate. Caudal peduncle as long as deep. Scales

feebly denticulate,  $31 \frac{3\frac{1}{2}}{11}$ ; lateral lines  $\frac{20}{11}$ . Pale brown above, silvery white below; dark brown blotches confluent into very irregular cross-bands on the body; a dark bar below the eye; a blackish blotch on

Fig. 143.

*Tilapia adolphi-frederici.*

Type (Deutsch. Z.-Afr. Exped.).

the end of the snout and chin; a dark brown opercular spot; fins yellowish, the bars of the body extending on the dorsal and anal; upper third of caudal blackish.

Total length 93 millim.

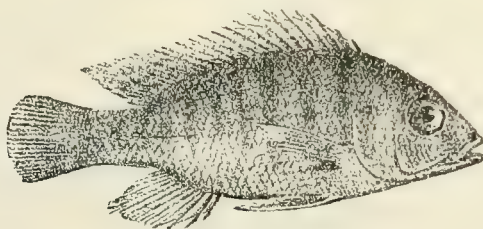
Lake Kivu.—Type in Berlin Museum.

#### 55. TILAPIA GIARDI.

Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 341, pl. v. fig. 2.

Depth of body equal to length of head,  $2\frac{2}{3}$  times in total length. Upper profile of head curved; snout shorter than postocular part of

Fig. 144.

*Tilapia giardi.*

Type, after Pellegrin (*l. c.*).

head; eye  $3\frac{1}{2}$  times in length of head; mouth  $\frac{3}{5}$  width of head, extending nearly to below anterior border of eye; teeth in 3 series; 6 series of

scales on the cheek. Gill-rakers short, 12 on lower part of anterior arch. Dorsal XV 14; spines subequal from the fifth, a little less than  $\frac{1}{2}$  length of head. Anal III 9. Pectoral shorter (?) than head, not reaching anal. Caudal rounded (?). Caudal peduncle as long as deep. Scales feebly denticulate, 34  $\frac{4\frac{1}{2}}{12}$ ; lateral lines  $\frac{22}{13}$ . Olive above, golden beneath; about 10 dark transverse bands; a dark opercular spot; soft dorsal with brownish dots.

Total length 78 millim.

Zambesi.—Type in Paris Museum.

#### 56. TILAPIA FUELLEBORNII.

Hilgend. & Pappenh. Sitzb. Ges. Naturf. Fr. Berl. 1903, p. 262.

Depth of body nearly equal to length of head, 3 times in total length. Snout as long as eye, which is  $3\frac{1}{2}$  times in length of head and equals interorbital width; mouth extending to between nostril and eye; teeth in 3 series in upper jaw, 20 to 44 in outer series; 4 series of scales on the cheek. About 8 gill-rakers. Dorsal XIV–XV 8–9; spines increasing in length to the last, which measures  $\frac{2}{5}$  length of head. Anal III 8; third spine as long as or a trifle shorter than last dorsal. Pectoral not quite reaching vertical of origin of anal. Ventral reaching vent or not quite so far. Caudal not emarginate. Caudal peduncle much longer than deep. Scales strongly denticulate, 28  $\frac{4}{13}$ ; lateral lines  $\frac{19}{11}$ . Brownish, borders of the mouth blackish.

Total length 43 millim.

Lake Rukwa.—Types in Berlin Museum.

#### 57. TILAPIA CALLIPTERA.

*Chromis callipterus*, Günth. Proc. Zool. Soc. 1893, p. 623, pl. lv. fig. B; Bouleng. op. cit. 1896, p. 916.

*Chromis subocularis*, part., Günth. l. c. p. 621.

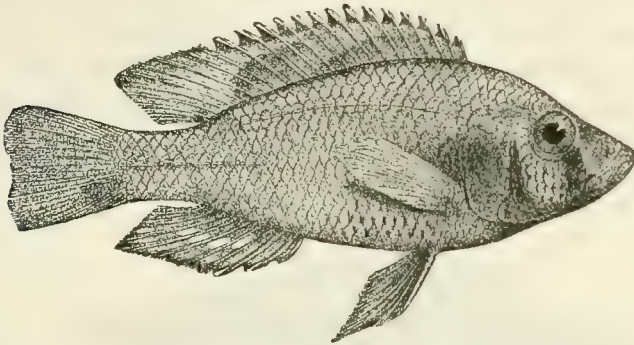
*Ctenochromis callipterus*, Pfeff. Thierw. O.-Afr., Fische, p. 19 (1896).

*Tilapia calliptera*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 4, and Proc. Zool. Soc. 1899, p. 132; Pellegr. Mém. Soc. Zool. France, xv. 1904, p. 336.

Depth of body  $2\frac{2}{3}$  to  $2\frac{4}{5}$  times in total length, length of head  $2\frac{3}{4}$  to 3 times. Head twice as long as broad; snout rounded, with straight upper profile, as long as broad, shorter than postocular part of head; eye a little shorter than snout,  $3\frac{1}{2}$  (young) to 4 times in length of head, equal to or a little less than interorbital width, a little more than least

præorbital depth; mouth  $\frac{2}{3}$  to  $\frac{3}{4}$  width of head, extending to below anterior border of eye; teeth in 3 to 5 series, outer larger, 40 to 60 in upper jaw; lateral teeth conical but passing generally into the bicuspid teeth; 3 or 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 8 to 10 on lower part of anterior arch. Dorsal XIV–XVI 8–10; last spine longest,  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head,  $\frac{2}{3}$  to  $\frac{4}{5}$  longest soft rays. Anal III 7–8; third spine as long as or a little shorter than longest dorsal. Pectoral  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head,

Fig. 145.

*Tilapia calliptera.*

Type, after Günther (P. Z. S. 1893). ♀.

not extending to vertical of origin of anal. Ventral reaching vent or origin of anal. Caudal rounded. Caudal peduncle as long as deep. Scales finely denticulate, 30–33  $\frac{3-4}{11-12}$ ; lateral lines  $\frac{19-22}{10-13}$ . Brown or olive, with more or less distinct dark and light spots on the soft dorsal and caudal fins; a more or less distinct dark band from below the eye to the angle of the mouth, sometimes extending to the chin; a dark opercular spot; anal fin often with a few large round white spots; ventrals black in males.

Total length 140 millim.

Lake Nyassa and Zambesi System.

1. Type.	L. Nyassa.	Mr. J. A. Williams (C.).
2–4. Types.	L. Nyassa and Upper Shiré.	Sir H. H. Johnston (P.).
5. Skel.	” ”	”
6–14. Types of	” ”	”
<i>C. subocularis.</i>		
15–16. Yg.	” ”	”
17. Hgr.	Between Kondowe and Karonga.	A. Whyte, Esq. (C.); Sir H. H. Johnston (P.).
18. Type.	Zomba.	” ”



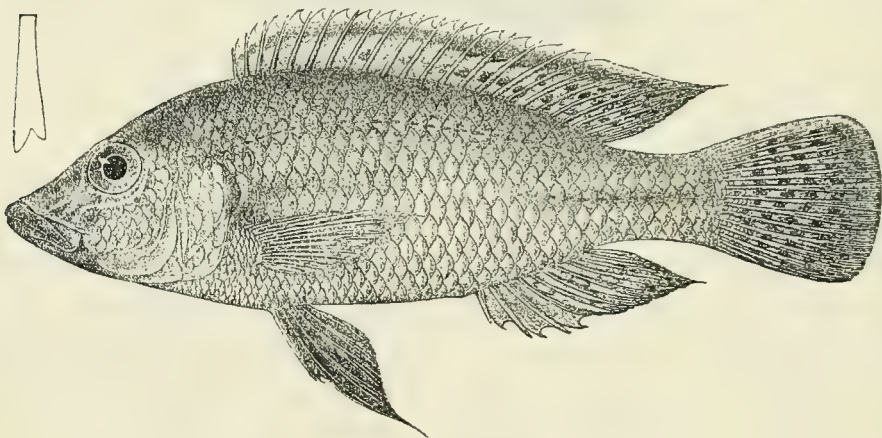
19-27. Hgr.	Zomba.	Sir H. H. Johnston (P.).
& yg.		
28-29. Yg.	Fort Johnston.	"
30. Hgr.	Umsitu R., Broken Hill, N.W. Rhodesia.	Rev. F. A. Rogers and E. C. Chubb, Esq. (P.).

58. *TILAPIA LUCULLÆ*.

Bouleng. Ann. & Mag. N. H. (8) xii. 1913, p. 483.

Depth of body equal to length of head, 3 times in total length. Head a little more than twice as long as broad; snout with straight upper profile, as long as broad, as long as postocular part of head, longer than eye, which is 4 times in length of head, equals interorbital width, and a little exceeds least depth of præorbital; mouth rather large,  $\frac{3}{4}$  width of head, extending nearly to below anterior border of eye; end of

Fig. 146.

*Tilapia lucullæ*.

Type.

maxillary exposed; teeth in 3 series, outer moderately large, 46 in outer row of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part a little less than diameter of eye. Gill-rakers short, 9 on lower part of anterior arch. Dorsal XVI 9-10; last spine longest, not quite  $\frac{1}{2}$  length of head, longest soft rays  $\frac{1}{2}$  to  $\frac{2}{3}$ . Anal III 8-9; third spine nearly as long as last dorsal. Pectoral  $\frac{3}{4}$  length of head, not extending to vertical of origin of anal. Ventral reaching vent or origin of anal. Caudal rounded. Caudal peduncle  $1\frac{1}{3}$  times as long as deep. Scales finely denticulate, 32-33  $\frac{3\frac{1}{2}}{11}$ ; lateral lines  $\frac{20-22}{12-13}$ . Brownish; dorsal and caudal with round blackish spots, the former with a dark

brown longitudinal band in its upper portion ; male with the mouth and ventrals blackish (dark blue in life), and a few large bright ocellar spots on the anal.

Total length 115 millim.

Angola.

1-2. Types.	Luculla R. at Luculla.	Dr. W. J. Ansorge (C.).
3. Skel.	" "	"

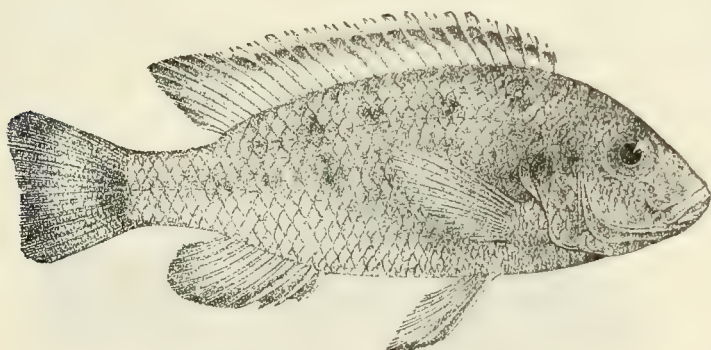
#### 59. TILAPIA WILLIAMSII.

*Chromis williamsi*, Günth. Proc. Zool. Soc. 1893, p. 624, pl. lvi. fig. C.

*Tilapia williamsi*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 4, and Proc. Zool. Soc. 1899, p. 132 ; Pellegr. Mém. Soc. Zool. France, xv. 1904, p. 335.

Depth of body equal to length of head, 3 times in total length. Head twice as long as broad ; snout broadly rounded, with slightly convex upper profile, broader than long, much shorter than postocular part of

Fig. 147.



*Tilapia williamsii*.

Type, after Günther (P. Z. S. 1893).

head ; eye a little shorter than snout, 4 times in length of head, a little less than interorbital width, equal to least depth of præorbital ; mouth broad,  $\frac{3}{4}$  width of head, with thick lips, extending to below anterior border of eye ; teeth in 5 or 6 series, outer larger ; in the upper jaw the lateral teeth are conical and rather abruptly differentiated from the others, which are bicuspid ; 52 teeth in outer series of upper jaw ; 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 10 on lower part of anterior arch. Dorsal XVII 8 ; last spine longest, nearly  $\frac{1}{2}$  length of head,  $\frac{3}{4}$  longest soft rays. Anal III 7 ; third spine a little shorter than last dorsal. Pectoral  $\frac{3}{4}$  length of head, not extending to origin of anal. Ventral reaching vent.

Caudal rounded, basal half densely scaled. Caudal peduncle slightly longer than deep. Scales finely denticulate,  $31 \frac{5}{13}$ ; lateral lines  $\frac{23}{11}$ . Dark brown, with scattered blackish spots; a blackish opercular spot; a round blackish spot at the root of the caudal; fins grey, dorsal and caudal broadly edged with black; two small round white spots on the posterior part of the anal.

Total length 105 millim.

Lake Nyassa.

1. Type.

L. Nyassa.

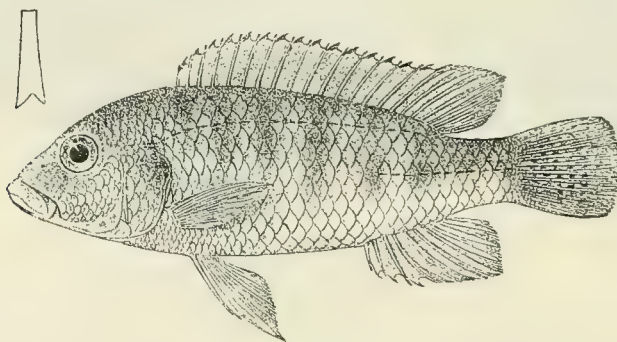
Mr. J. A. Williams (C.).

#### 60. TILAPIA STIGMATOGENYS.

Bouleng. Rev. Zool. Afr. ii. 1913, p. 394.

Depth of body equal to length of head, 3 times in total length. Head nearly twice as long as broad; snout rounded, with straight or slightly convex upper profile, a little broader than long, as long as or a little shorter than postocular part of head,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times diameter of eye, which is  $3\frac{1}{2}$  (young) to  $4\frac{1}{2}$  times in length of head and equals

Fig. 148.



*Tilapia stigmatogenys.*

Type.

interorbital width or depth of præorbital; mouth about  $\frac{3}{4}$  width of head, extending to below anterior border of eye; lips thick; teeth in 3 or 4 series, outer moderately large and 40 to 50 in upper jaw; 4 or 5 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 7–8 on lower part of anterior arch. Dorsal XV (rarely XVI) 9–10 (rarely 8); spines equal from the sixth,  $\frac{1}{3}$  length of head; longest soft rays  $\frac{2}{5}$  length of head. Anal III 7; third spine as long as dorsals. Pectoral about  $\frac{2}{3}$  length of head, widely separated

from anal. Ventral reaching vent. Caudal rounded. Caudal peduncle as long as deep or a little deeper than long. Scales feebly denticulate, 27-29  $\frac{2-3}{10-11}$ ; lateral lines  $\frac{18-21}{10-12}$ . Brownish above, white beneath, uniform or with 7 or 8 rather indistinct dark cross-bands; a blackish opercular spot; two or three dark streaks across the top of the head and another, oblique, from the anterior third of the eye to the mouth; usually a black spot on the chin; spinous dorsal greyish with round light spots; soft dorsal yellow with oblique blackish bars; anal yellow, blackish towards the edge; caudal yellow with small round blackish spots.

Total length 105 millim.

Upper Congo.—Types in Congo Museum, Tervueren.

1-6. Types.

Luluaburg.

Rev. P. Callewaert (C.).

#### 61. TILAPIA STORMSI.

Bouleng. Proc. Zool. Soc. 1902, i. p. 270, pl. xxx. fig. 2; Pellegr. Mém. Soc. Zool. France, xvi, 1904, p. 339.

Depth of body equal to length of head, 3 to  $3\frac{1}{4}$  times in total length. Head twice as long as broad; snout rather pointed, with straight or

Fig. 149.



*Tilapia stormsi*.

Type (P. Z. S. 1902).  $\frac{3}{4}$ .

slightly convex upper profile, as long as broad, as long as postocular part of head,  $1\frac{1}{3}$  to  $1\frac{2}{3}$  times diameter of eye, which is  $3\frac{1}{2}$  (young) to  $4\frac{1}{2}$  times in length of head and equals interorbital width or depth of præorbital; mouth about  $\frac{2}{3}$  width of head, extending to between nostril and eye; teeth in 4 to 7 series, outer rather large and about 40 to 50 in upper jaw; 3 or 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 10-12 on lower part of anterior arch. Dorsal XVI-XVII 9; last spine longest, about  $\frac{2}{5}$  length of head; longest soft rays about  $\frac{1}{2}$  length of head. Anal III 7; third



spine about  $\frac{1}{3}$  length of head. Pectoral about  $\frac{2}{3}$  length of head, widely separated from anal. Ventral not reaching vent. Caudal rounded. Caudal peduncle as long as deep. Scales with strong marginal denticulation, 30-31  $\frac{2\frac{1}{2}-3}{16-17}$ ; lateral lines  $\frac{21-23}{6-11}$ ; scales on occiput and nape very small. Olive-brown above, some of the scales black at the base; 5 or 6 more or less indistinct dark cross-bands; a blackish opercular spot; dorsal and caudal fins with small dark spots; a fine blackish edge to the dorsal and to the caudal above and beneath.

Total length 115 millim.

Upper Congo.—Types in Brussels Museum.

- |                      |                |   |
|----------------------|----------------|---|
| 1. One of the types. | Lindi R.       | M. M. Storms (C.);<br>Brussels Museum (P.). |
| 2-3. Ad. & yg.       | Stanley Falls. | Dr. C. Christy (C.).                        |

## 62. TILAPIA HORII.

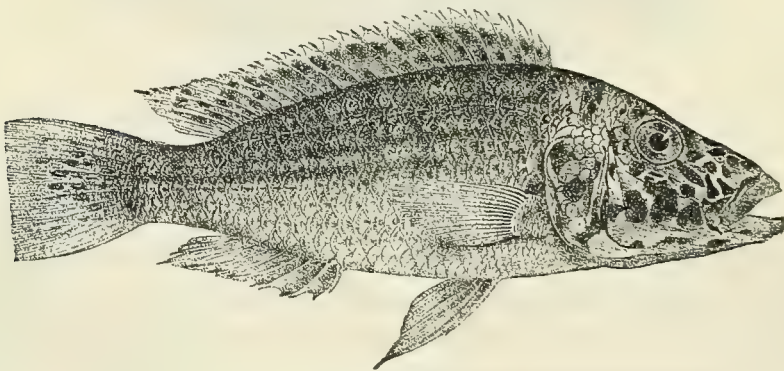
*Chromis horii*, Günth. Proc. Zool. Soc. 1893, p. 630, pl. lviii. fig. A.

*Tilapia horii*, Bouleng. Proc. Zool. Soc. 1899, p. 122, and Poiss. Bass. Congo, p. 463 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 328

*Tilapia rubropunctata*, Bouleng. Tr. Zool. Soc. xv. 1899, p. 93, pl. xx. fig. 2, Ann. Mus. Congo, Zool. i. p. 149, pl. lv. fig. 1 (1900), and Poiss. Bas. Congo, p. 464.

Depth of body 3 to  $3\frac{1}{3}$  times in total length, length of head  $2\frac{2}{3}$  to  $2\frac{4}{5}$  times. Head  $2\frac{1}{5}$  to  $2\frac{1}{2}$  times as long as broad; snout with straight

Fig. 150.



*Tilapia horii*.

Type of *T. rubropunctata* (Tr. Z. S. 1899).

upper profile, longer than broad, as long as postocular part of head,  $1\frac{1}{2}$  to 2 times as long as eye, which is 4 to  $4\frac{3}{4}$  times in length of head and

equals or slightly exceeds interorbital width or least depth of præorbital; mouth rather large,  $\frac{2}{3}$  to  $\frac{3}{4}$  width of head, extending to between nostril and eye; end of maxillary exposed; teeth small, in 4 or 5 series, 44 to 60 in outer series of upper jaw; 3 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, 12 or 13 on lower part of anterior arch. Dorsal XV-XVI 8-10; spines subequal from the sixth or seventh,  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; longest soft rays about  $\frac{1}{2}$  length of head. Anal III 6-8; third spine as long as or a little shorter than longest dorsal. Pectoral  $\frac{2}{3}$  length of head, not reaching vertical of origin of anal. Ventral reaching vent or origin of anal. Caudal rounded-subtruncate, or truncate. Caudal peduncle as long as deep or a little longer than deep. Scales cycloid, or a few finely denticulated, 29-33  $\frac{3-5}{11-12}$ ; lateral lines  $\frac{19-22}{11-14}$ . Olive-brown above, pale yellow beneath; seven to ten dark cross-bars on the back; each scale of the back and sides with a central vermilion spot; head spotted and marbled with dark purplish brown; lower jaw and lower part of opercular region bright yellow; dorsal and caudal fins bright yellow, spotted with dark brown; pectoral yellow; branchiostegal membrane, pectoral region, outer edge of ventrals, and anal vermilion-red. Young with 10 to 12 very distinct and regular dark bars.

Total length 195 millim.

Lake Tanganyika.

1-3. Types.	Near Ujiji.	E. Coode Hore, Esq. (C.).
4. One of the types of <i>T. rubropunctata</i> .	Moliro.	Capt. Lemaire (C.).
5. Ad.	Niamkolo.	Dr. W. A. Cunningham (C.).
6. Skel.	"	"
7. Hgr.	Sumbu.	"
8. Ad.	Tongwe.	Dr. L. Stappers (C.).
9. Ad.	Kapampa.	"
10-20. Hgr. & yg.	Vua.	"

### 63. TILAPIA PERRIERI.

Pellegr. Bull. Soc. Zool. France, 1909, p. 156, and Mém. Soc. Zool. France, xxii. 1910, p. 295, pl. xiv. fig. 4.

Depth of body  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times in total length, length of head 3 times. Head a little more than twice as long as broad, with straight upper profile; snout a little shorter than eye, which is 3 to  $3\frac{1}{3}$  times in length

of head and exceeds interorbital width; lower jaw projecting; mouth extending a little beyond anterior border of eye; teeth in 3 or 4 rows, outer bicuspid, others tricuspid; 36 to 40 teeth in outer row of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part  $\frac{2}{3}$  diameter of eye. Gill-rakers moderately long, 9 on lower part of anterior arch. Dorsal XV–XVI 9; spines subequal from the sixth or seventh,  $\frac{2}{5}$  or a little less than  $\frac{1}{2}$  length of head. Anal III 8; third spine as long as and stronger than longest dorsals. Pectoral as long as or a little shorter than head, reaching, or nearly reaching, vertical of origin of anal. Ventral extending beyond vent. Caudal truncate. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times as long as deep. Scales strongly denticulate, 32–33  $\frac{5}{12}$ ; lateral lines  $\frac{20-21}{8-13}$ . Olive above, orange beneath, with two black lateral bands, the upper above the upper lateral line and extending to the end of the dorsal, the lower from the opercular spot to the root of the caudal fin; fins uniform yellowish, ventrals sometimes blackish. The specimen in the British Museum uniform brownish above and white below.

Total length 74 millim.

Lake Victoria.—Types in Paris Museum.

1. Hgr. Kisumu Bay, Kavirondo. A. Blayney Percival, Esq. (P.).

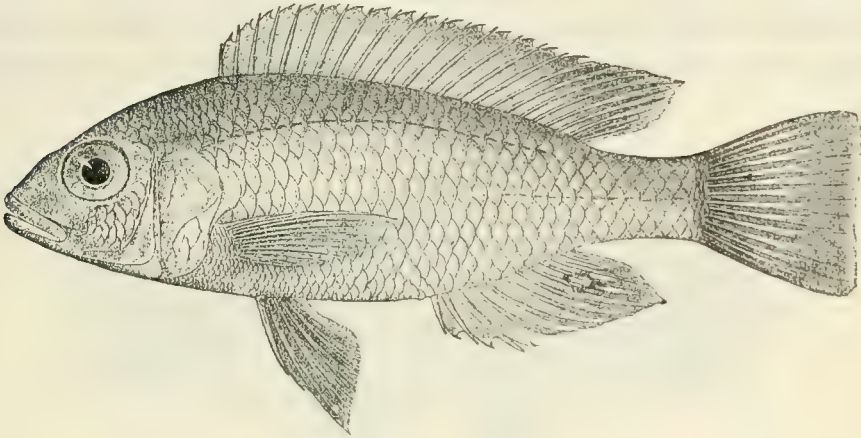
#### 64. TILAPIA HUMILIOR.

Bouleng. Ann. Mus. Genova, (3) v. 1911, p. 74, pl. iii. fig. 3.

Depth of body  $3\frac{1}{3}$  to  $3\frac{2}{3}$  times in total length, length of head 3 to  $3\frac{1}{4}$  times. Head  $2\frac{1}{3}$  to  $2\frac{1}{2}$  times as long as broad, upper profile forming an even curve; snout rounded, as long as broad, as long as eye, which is  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times in length of head, equals interorbital width, and exceeds least depth of præorbital; jaws equal in front; mouth extending to below anterior border of eye; teeth small, slender, closely set, in 4 or 5 rows; 44 to 54 teeth in outer row of upper jaw; 3 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, 7 or 8 on lower part of anterior arch. Dorsal XV–XVI 9–10; spines increasing in length to the last, which measures  $\frac{1}{2}$  length of head; longest soft rays  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head. Anal III 8–10; third spine as long as or a little shorter than last dorsal. Pectoral shorter than head, not reaching vertical of origin of anal. Ventral not reaching origin of anal. Caudal rounded-subtruncate. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{3}{4}$  times

as long as deep. Scales rather strongly denticulate, very small on pectoral region,  $32-33 \frac{4}{10}$ ; lateral lines  $\frac{20-23}{11-13}$ . Brown above, whitish beneath; a more or less distinct vertical dark bar below anterior third of eye; dorsal, caudal, and pectoral fins brown, anal brownish or yellow,

Fig. 151.

*Tilapia humilior.*

Type (Ann. Mus. Genova, 1911).

with or without two or three ocellar spots; ventrals black in the male, yellow in the female.

Total length 110 millim.

Victoria Nile.—Types in Genoa Museum.

1-2. Types.

Kakindu.

Dr. E. Bayon (C.); Genoa  
Museum (P.).

## 65. TILAPIA PALLIDA.

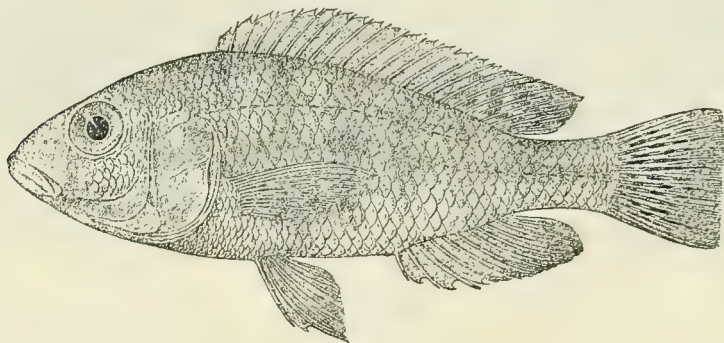
Bouleng. Ann. Mus. Genova, (3) v. 1911, p. 72, pl. ii. fig. 1.

Depth of body 3 to  $3\frac{1}{2}$  times in total length, length of head  $2\frac{2}{3}$  to 3 times. Head 2 to  $2\frac{1}{4}$  times as long as broad, upper profile descending in an even, strong curve; snout rounded, as long as broad or a little broader than long, as long as or a little longer than eye, which is 3 (young) to  $3\frac{2}{3}$  times in length of head, equals interorbital width, and exceeds least depth of præorbital; jaws equal in front; maxillary not extending quite to below anterior border of eye; teeth small, in 3 or 4 rows, outer largest, with oblique bicuspid crowns, 30 to 50 in upper jaw, inner conical or indistinctly tricuspid; 3 or 4 series of scales on the cheek, the



depth of the scaly part below the eye about  $\frac{2}{3}$  diameter of latter. Gill-rakers short, some bifid, 7 or 8 on lower part of anterior arch. Dorsal XV–XVI 8–10 (usually 9) nearly equal in length from the fifth or sixth, about  $\frac{2}{5}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Anal III 8–9 (usually 9); third spine longest, as long as longest dorsals. Pectoral acutely pointed, as long as or a little shorter than head, reaching vertical of origin of anal. Ventral reaching, or nearly reaching, origin of anal. Caudal truncate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{2}{3}$  times as long

Fig. 152.

*Tilapia pallida.*

Type (Ann. Mus. Genova, 1911).

as deep. Scales feebly denticulate, very small on pectoral region, 30–33  $\frac{4-5}{11-12}$ ; lateral lines  $\frac{18-23}{8-13}$ . Yellowish or pale brownish, with 6 to 8 more or less distinct dark cross-bars, which may be traversed by a dark lateral band extending from the eye to the caudal fin; fins yellowish or pale brownish, soft dorsal and caudal sometimes with small round dark spots.

Total length 130 millim.

Lake Victoria and Ripon Falls.—Types in Genoa Museum.

1–4. Types.	Bussu, L. Victoria.	Dr. E. Bayon (C.); Genoa Museum (P.).	
5–10. Ad. & hgr.	L. Victoria.	“	“
11–14. Types.	Jinja, Ripon Falls.	“	“
15. Skel.	“ “	“	“

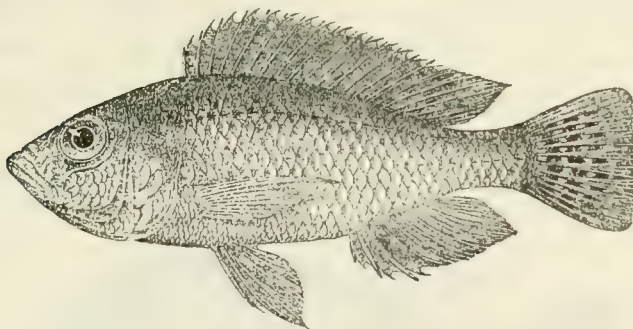
#### 66. TILAPIA PAPPENHEIMI.

Bouleng. in Schubotz, Wiss. Ergebn. Deutsch. Z.-Afr. Exped., Zool. iii. p. 254, pl. vii. fig. 1 (1914).

Depth of body 3 to  $3\frac{3}{4}$  times in total length, length of head 3 to  $3\frac{1}{4}$  times. Head  $2\frac{1}{3}$  to  $2\frac{1}{2}$  times as long as broad, upper profile forming

an even curve; snout rounded, as long as broad, as long as eye, which is  $3\frac{1}{5}$  to  $3\frac{1}{3}$  times in length of head, equals interorbital width, and exceeds least depth of præorbital; jaws equal in front; mouth extending to below anterior border of eye, or not quite so far; teeth small, in 3 or 4 series, 40 to 54 in outer series of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers moderately long, 10 to 12 on lower part of anterior arch. Dorsal XV-XVI 8-10; spines slightly increasing in length to the last, which

Fig. 153.



*Tilapia pappenheimi*.  
Type (Deutsch. Z.-Afr. Exped.).

measures  $\frac{1}{3}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Anal III 7-9, third spine as long as or a little shorter than last dorsal. Pectoral as long as or a little shorter than head, extending to vertical of origin of anal, or not quite so far. Ventral reaching vent or anal in female, a little farther in male. Caudal truncate. Caudal peduncle  $1\frac{1}{2}$  to 2 times as long as deep. Scales rather strongly denticulate, very small on pectoral region, 31-34  $\frac{4-4\frac{1}{2}}{12-13}$ ; lateral lines  $\frac{18-23}{10-13}$ . Female uniform brownish above, silvery below; male with a vertical black bar below the eye, the gular and ventral surface brown or blackish, the ventrals black; one or two large bright ocellar spots sometimes present on the anal.

Total length 110 millim.

Lake Albert Edward.—Types in Berlin Museum.

1-5, 6. Types.

L. Albert Edward.

Dr. H. Schubotz (C.);

German C. African Exped.

7. Skel.

”

”

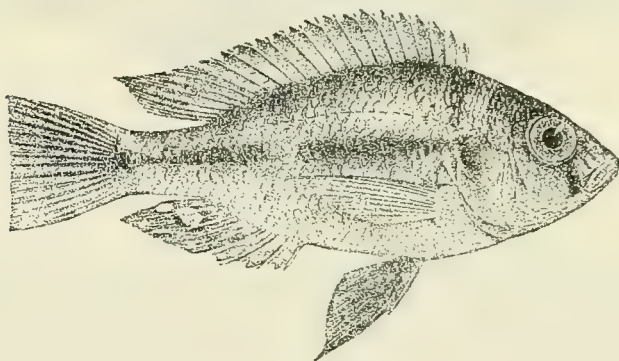
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67. *TILAPIA LACRIMOSA*.

Bouleng. Ann. & Mag. N. H. (7) xvii. 1906, p. 450, Fish. Nile, p. 515, pl. xci. fig. 3 (1907), and Ann. Mus. Genova, (3) v. 1911, p. 73.

Depth of body  $2\frac{1}{2}$  to 3 times in total length, length of head 3 to  $3\frac{1}{2}$  times. Head 2 to  $2\frac{1}{4}$  times as long as broad, snout with straight or slightly convex upper profile, as long as broad, or a little broader than long, as long as eye, which is  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times in length of head, equals interorbital width, and exceeds least depth of præorbital; mouth moderately oblique, extending to below anterior border of eye or a little beyond; teeth in 3 to 5 series, outer bicuspid, inner tricuspid, 30 to 50 in outer series of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part a little less than diameter of eye. Gill-rakers short, 7 to 9

Fig. 154.

*Tilapia lacrimosa*.

Type (F. N.).

on lower part of anterior arch. Dorsal XV–XVI 8–9; spines increasing in length to the last, which measures  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head. Anal III 8–9; third spine as long as and stronger than last dorsal. Pectoral as long as head, extending to vertical of origin of anal or a little beyond. Ventral reaching origin of anal or a little beyond. Caudal truncate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{2}{3}$  times as long as deep. Scales strongly denticulate, 30–34  $\frac{4-5}{12-13}$ ; lateral lines  $\frac{19-24}{10-13}$ . Pale olive or reddish brown above, white or grey beneath; belly sometimes (in males) blackish; usually two blackish cross-bars on the upper surface of the snout and a broader one on the occiput; a black vertical bar below anterior third of eye, rarely

indistinct or absent, sometimes another below posterior border of eye; a black opercular spot; more or less indistinct dark bars on the body, and a lateral series of blackish blotches sometimes confluent into a longitudinal band; dorsal fin greyish, usually with small darker or lighter spots; anal and lower half of caudal bright yellow, the former usually with one, two, or three orange ocellar spots encircled with red; ventrals usually black or blackish.

Total length 110 millim.

Lake Victoria, Victoria Nile, Lake Albert Edward.

1-10. Types.	Entebbe.	Mr. E. Degen (C.).
11-12. Types.	Buganga.	..
13-18. Types.	Bunjako.	..
19. Skel.	"	"
20, 21-24. Ad. & hgr.	Sesse Islands.	Dr. E. Bayon (C.); Genoa Museum (P.).
25-26. Ad.	Buddu Coast.	Mr. M. Simon (C.).
27. Ad.	Kavirondo Bay.	M. Alluand (C.); Paris Museum (E.).
28-29. Ad.	Kisumu Bay, Kavirondo.	A. Blayney Percival, Esq. (P.).
30-31. Ad.	Jinja, Ripon Falls.	Dr. E. Bayon (C.); Genoa Museum (P.).
32. Ad.	Bululo, L. Kioga.	" "

#### 68. TILAPIA NUBILA.

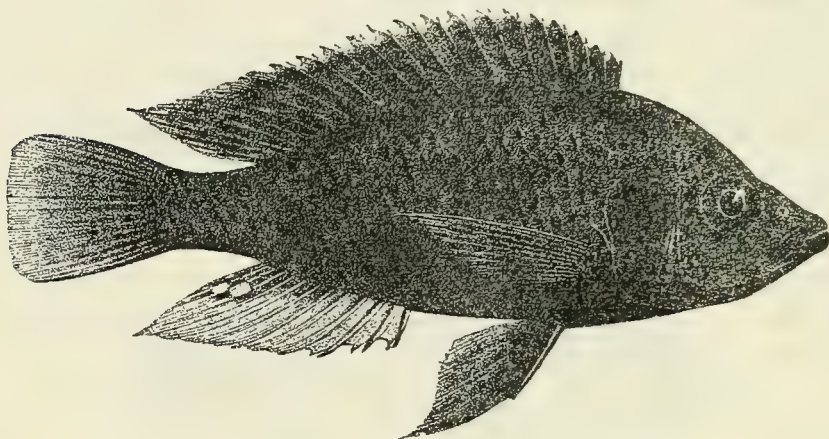
Bouleng. Ann. & Mag. N. H. (7) xvii. 1906, p. 450, Fish. Nile, p. 517, pl. xci. fig. 4 (1907); Pellegr. Mém. Soc. Zool. France, xxii. 1910, p. 296; Bouleng. Ann. Mus. Genova, (3) v. 1911, p. 73.

Depth of body equal to length of head,  $2\frac{3}{5}$  to 3 times in total length. Head 2 to  $2\frac{1}{4}$  times as long as broad; snout as long as broad, with straight or slightly convex upper profile, as long as eye, which is 3 to  $3\frac{1}{2}$  times in length of head, equals interorbital width, and much exceeds least depth of præorbital; mouth with thick lips, extending to below anterior border of eye or not quite so far; teeth in 3 or 4 series, outer largest and numbering 40 to 60 in upper jaw; 3 or 4 series of scales on the cheek, width of scaly part nearly equal to diameter of eye in adult. Gill-rakers rather short, 8 or 9 on lower part of anterior arch. Dorsal XV-XVI 8-10; spines increasing in length to the last or last four,  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{4}{5}$  length of head. Anal III 8-10; third spine as long as longest dorsal. Pectoral  $\frac{3}{4}$  to



once length of head, extending to vertical of origin of anal or a little beyond. Ventral extending to origin of anal or beyond. Caudal rounded. Caudal peduncle  $1\frac{1}{4}$  to 2 times as long as deep. Scales strongly denticulate, 29-33  $\frac{3-4}{11-12}$ ; lateral lines  $\frac{18-21}{9-14}$ . Adult male black, the anal fin and the border of the caudal often bright vermilion; orange ocellar spots sometimes present on the anal. Female and young dark grey or brown to blackish, with or without black bars on the body;

Fig. 155.

*Tilapia nubiæ.*Type (F. N.).  $\frac{7}{8}$ .

usually a black vertical bar below the anterior third of the eye; a black opercular spot; dorsal and anal fins dark grey or brown and, like the soft dorsal, with more or less distinct small darker spots; ventral fins greyish or yellow.

Total length 120 millim.

Lake Victoria and Victoria Nile.

1-6, 7-16. Types,	Entebbe.	Mr. E. Degen (C.).
17-18. Ad.	Buddu Coast.	Mr. M. Simon (C.).
19-21. Ad.	Jinja, Ripon Falls.	Dr. E. Bayon (C.) ; Genoa Museum (P.).
22-28. Ad.	Bululo, L. Kioga.	" "
29. Skel.	" "	" "
30. Skel.	Kakindu, Victoria Nile.	" "
31-38. Ad.	Malawa R., Kavirondo, 4000 f.	Sir F. J. Jackson (P.).

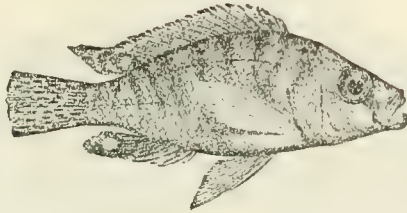
## 69. TILAPIA PECTORALIS.

*Ctenochromis pectoralis*, Pfeff. Jahrb. Hamb. Wiss. Anst. x. 1893, p. 153, pl. ii. figs. 3, 4, 7, and Thierw. O.-Afr., Fische, p. 16, fig. (1896).

*Tilapia pectoralis*, Bouleng. Proc. Zool. Soc. 1899, p. 130; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 338.

Depth of body nearly equal to length of head,  $2\frac{4}{5}$  times in total length. Head twice as long as broad; snout rounded, with straight upper profile, as long as broad, shorter than postocular part of head, as long as the eye, which is somewhat more than 3 times in length of head, slightly exceeds interorbital width, and equals twice præorbital depth; mouth rather large, extending nearly to below anterior border of eye, end of

Fig. 156.

*Tilapia pectoralis*.

Type, after Pfeffer (Jahrb. Hamb. Anst. 1893).

maxillary exposed; teeth in 5 series, outer rather large, inner very minute; 3 series of scales on the cheek, width of scaly part much less than diameter of eye. Gill-rakers very short, 10 on lower part of anterior arch. Dorsal XV–XVI 8–9; spines subequal from the fifth or sixth, about  $\frac{2}{5}$  length of head; soft rays longer. Anal III 8; third spine as long as longest dorsals. Pectoral nearly as long as head, extending as far as origin of anal. Ventral reaching origin of anal. Caudal truncate. Caudal peduncle as long as deep. Scales strongly denticulate,  $30\frac{4}{10}$ ; lateral lines  $\frac{21-22}{8-12}$ . Brownish, with 10 to 12 dark bars; a dark opercular spot; dark streaks and a large white, dark-edged ocellus on the soft dorsal and on the anal.

Total length 63 millim.

Korogwe, German East Africa.—Types in Hamburg Museum.

1. One of the types.

Korogwe.

Dr. Stuhlmann (C.);

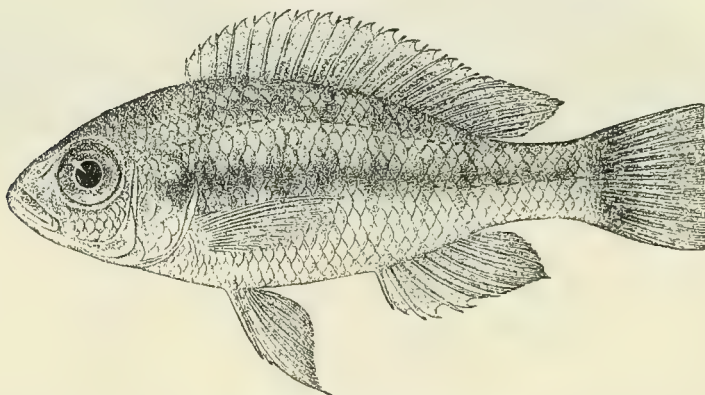
Hamburg Museum (E.).

## 70. TILAPIA MACROPS.

Bouleng. Ann. Mus. Genova, (3) v. 1911, p. 73, pl. iii. fig. 1.

Depth of body equal to length of head,  $2\frac{3}{4}$  to 3 times in total length. Head twice, or a little over twice, as long as broad; snout rounded, a little broader than long, with slightly convex upper profile, shorter than eye, which is 3 times in length of head, equals interorbital width, and much exceeds least depth of præorbital; jaws equal in front; maxillary extending to below anterior border of eye; teeth small, in 3 or 4 rows, outer largest and bicuspid, others tricuspid; about 60 teeth in outer row of upper jaw; 3 series of scales on the cheek, the depth of the scaly part below the eye about  $\frac{2}{3}$  diameter of latter. Gill-rakers moderate, 10 to 12 on lower part of anterior arch. Dorsal XV–XVI 9–10; spines

Fig. 157.



*Tilapia macrops.*

Type (Ann. Mus. Genova, 1911).

equal from the seventh or eighth, which measures about  $\frac{2}{5}$  length of head; longest soft rays a little more than  $\frac{1}{2}$  length of head. Anal III 9; third spine longest,  $\frac{2}{5}$  length of head. Pectoral pointed,  $\frac{3}{4}$  length of head, not reaching vertical of origin of anal. Ventral reaching origin of anal. Caudal truncate. Caudal peduncle a little longer than deep. Scales rather strongly denticulate, 32–33  $\frac{4}{10-11}$ ; lateral lines  $\frac{21-22}{11-13}$ . Brownish above, whitish beneath, with 7 to 10 rather indistinct dark cross-bars which may be traversed by a dark lateral stripe extending from the opercular spot to the caudal fin; fins brownish.

Total length 100 millim.

Lake Victoria and Ripon Falls, Lake Albert Edward.—Types in Genoa Museum.

1. One of the types.

Bussu, L. Victoria.

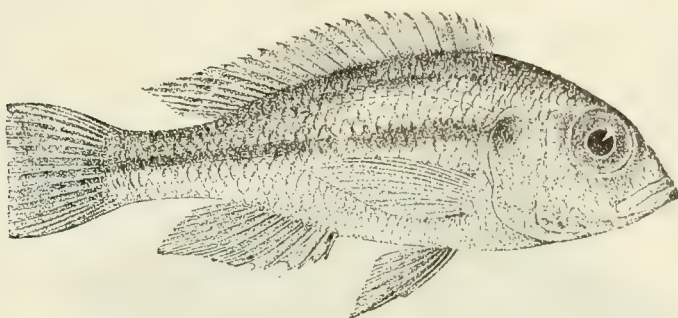
Dr. E. Bayon (C.);  
Genoa Museum (P.).

## 71. TILAPIA MARTINI.

Bouleng. Ann. & Mag. N. H. (7) xvii. 1906, p. 449, Fish. Nile, p. 514, pl. xci. fig. 2 (1907), and in Schubotz, Wiss. Ergebn. Deutsch. Z.-Afr. Exped., Zool. iii. p. 255 (1914).

Depth of body  $2\frac{2}{5}$  to 3 times in total length, length of head  $2\frac{4}{5}$  to 3 times; body deepest at the nape. Head twice as long as broad; snout rounded, broader than long, profile descending in a steep oblique line, shorter than eye, which is  $2\frac{2}{3}$  to 3 times in length of head, exceeds interorbital width, and equals twice least depth of præorbital; mouth not very oblique, extending to below anterior third of eye; teeth small, in 3 or 4 series, 40 to 70 in outer series of upper jaw; 4 or 5 series of scales on the cheek, width of scaly part equal to or less than diameter of eye. Gill-rakers short, some T-shaped, 8 or 9 on lower part of anterior

Fig. 158.

*Tilapia martini*.

Type (F. N.).

arch. Dorsal XV–XVI 8–10; spines equal from the eighth or ninth,  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; longest soft rays  $\frac{1}{3}$  to  $\frac{3}{5}$  length of head. Anal III 8–9; third spine as long as and stronger than longest dorsal. Pectoral as long as head, reaching beyond vertical of origin of anal. Ventral reaching origin of anal or a little beyond. Caudal truncate. Caudal peduncle  $1\frac{2}{3}$  times as long as deep. Scales feebly denticulate,  $32-33 \frac{4-5}{13-15}$ ; lateral lines  $\frac{19-22}{10-15}$ . Yellowish olive above, white beneath; a dark vertical bar below the eye and one or three cross-bars on the head often present; a blackish opercular spot; a blackish stripe may extend from the latter to the root of the caudal fin, as well as a second, more or less distinct, higher up on the side of the back; some specimens uniform dark grey or brownish; dorsal and anal fins greyish, with more or less distinct round darker spots; pectoral and anal fins yellow, the



latter sometimes with one or two orange ocellar spots in the posterior part; ventral fins yellow in the females, black in the males.

Total length 110 millim.

Lakes Victoria and Albert Edward.

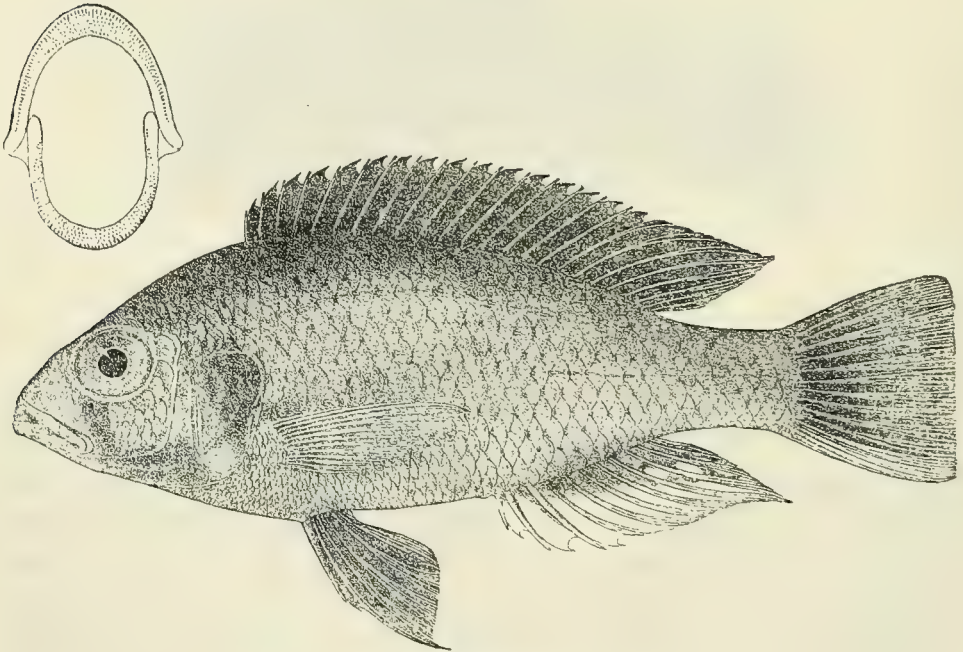
1-7. Types.	Bunjako.	Mr. E. Degen (C.).
8. Yg.	Kisumu Bay, Kavirondo.	A. Blayney Percival, Esq. (P.).
9-12. Ad.	L. Albert Edward.	Dr. H. Schubotz (C.); German C. African Expedition.

## 72. TILAPIA BAYONI.

Bouleng. Ann. Mus. Genova, (3) v. 1911, p. 72, pl. iii. fig. 2.

Depth of body equal to length of head, 3 times in total length. Head twice, or a little over twice, as long as broad; snout rounded, as long as broad, with convex upper profile, a little shorter than eye, which is

Fig. 159.



*Tilapia bayoni*.

Type (Ann. Mus. Genova, 1911).

3 times in length of head, and exceeds interorbital width and least depth of præorbital; jaws equal in front; maxillary extending a little beyond vertical of anterior border of eye; teeth small, in 5 or 6 rows, outer largest and bicuspid, others tricuspid; 60 to 70 teeth in outer row of

upper jaw ; 3 or 4 series of scales on the cheek, the depth of the scaly part below the eye about  $\frac{2}{3}$  diameter of latter. Gill-rakers rather short, 7 or 8 on lower part of anterior arch. Dorsal XV–XVI 9–10 ; spines increasing in length to the last, which measures  $\frac{1}{2}$ , or nearly  $\frac{1}{2}$ , length of head ; longest soft rays  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Anal III 9–10 ; third spine longest, about  $\frac{2}{3}$  length of head. Pectoral obtusely pointed,  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head, not reaching vertical of origin of anal. Ventral reaching origin of anal or a little beyond. Caudal rounded-subtruncate. Caudal peduncle  $1\frac{1}{4}$  to  $1\frac{1}{3}$  times as long as deep. Scales feebly denticulate, very small on pectoral region, 30–33  $\frac{4}{10}$  ; lateral lines  $\frac{19-23}{12-13}$ . Back dark olive to blackish, sides brassy yellow to coppery red ; a more or less distinct black bar below the eye ; dorsal and ventrals brown to black ; anal pink, blackish at the base, usually with two or three large orange ocellar spots ; caudal brown or blackish, the lower third often pink.

Total length 130 millim.

Victoria Nile.—Types in Genoa Museum.

1-2. Types.	Kakindu.	Dr. E. Bayon (C.) ;
		Genoa Museum (P.).
3. Skel.	”	”

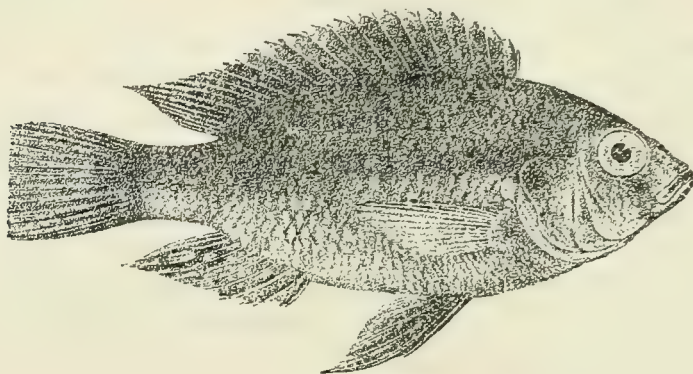
### 73. TILAPIA NIGRICANS.

Bouleng. Ann. & Mag. N. H. (7) xvii. 1906, p. 448, Fish. Nile, p. 518, pl. xci. fig. 5 (1907), and Ann. Mus. Genova, (3) v. 1911, p. 75.

Depth of body  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times in total length, length of head 3 times. Head twice as long as broad, upper profile curved ; snout broader than long, as long as or a little shorter than eye, which is  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times in length of head, equals interorbital width, and much exceeds least præ-orbital depth ; mouth small, with thick lips, not extending to below anterior border of eye ; teeth small, in 6 or 7 series, outer largest and numbering 44 to 60 in upper jaw ; 3 series of scales on the cheek, width of scaly part a little less than diameter of eye. Gill-rakers moderately long, 8 to 10 on lower part of anterior arch. Dorsal XV–XVI 9–10 ; spines equal from the eighth or ninth, nearly  $\frac{1}{2}$  length of head ; longest soft rays  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head. Anal III 9–10 ; third spine as long as longest dorsals. Pectoral nearly as long as head, not extending to vertical of origin of anal. Ventral extending beyond origin of anal. Caudal truncate. Caudal peduncle slightly longer than deep. Scales finely denticulate, 31–32  $\frac{5}{14}$  ; lateral lines  $\frac{21-23}{11-12}$ . Blackish or steel-grey

above, somewhat lighter beneath; seven ill-defined black bars on the body, and a vertical black bar below the anterior third of the eye; a black opercular spot; dorsal and ventral fins dark brown or black, the

Fig. 160.

*Tilapia nigricans.*

Type (F. N.).

other fins dark greyish brown, the anal often with 3 or 4 orange ocellar spots.

Total length 140 millim.

Lake Victoria and Victoria Nile.

1-2. Types.	Entebbe.	Mr. E. Degen (C.).
3. Ad.	Kakindu, Victoria Nile.	Dr. E. Bayon (C.); Genoa Museum (P.).
4. Skel.	„ „	„ „

## 74. TILAPIA SIMOTES.

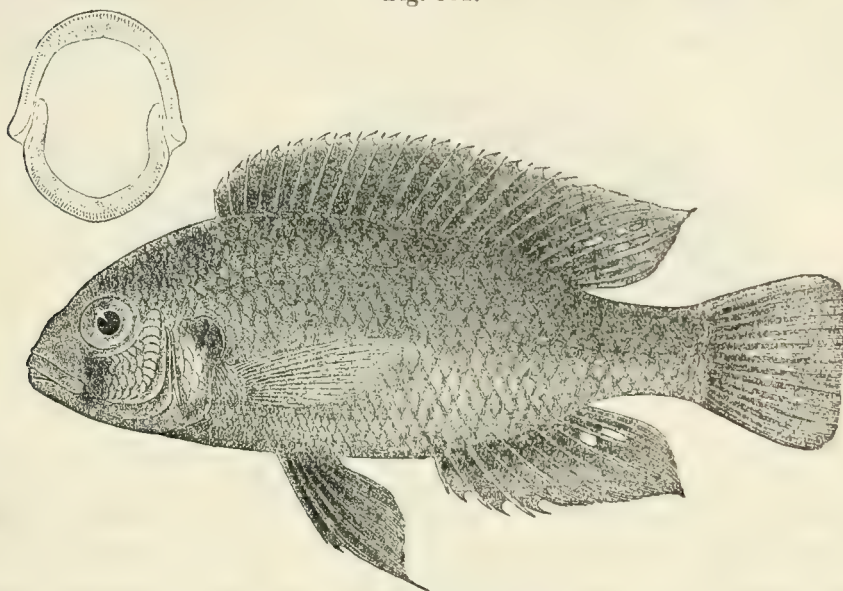
Bouleng. Ann. Mus. Genova, (3) v. 1911, p. 75, pl. iii. fig. 4.

Depth of body equal to or a little greater than length of head,  $2\frac{3}{4}$  to 3 times in total length. Head twice as long as broad, upper profile forming an even, strong curve; snout broadly rounded, much broader than long, as long as eye, which is  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times in length of head, equals interorbital width, and exceeds least depth of præorbital; upper jaw projecting beyond lower; maxillary extending to below anterior border of eye, or a little beyond; teeth small, very slender, closely set, in 6 to 8 series, outer bicuspid, others tricuspid; 68 to 80 teeth in outer series of upper jaw; 3 or 4 series of scales on the cheek, the depth of the scaly part below the eye a little less than diameter of latter. Gill-rakers rather short, 8 or 9 on lower part of anterior arch. Dorsal XV-XVI 9-10; spines increasing in length to the last, which measures



$\frac{1}{2}$  length of head; longest soft rays  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head. Anal III 8-9; third spine longest, nearly as long as last dorsal. Pectoral a little shorter than head, not reaching vertical of origin of anal. Ventral reaching origin of anal or a little beyond. Caudal rounded. Caudal peduncle slightly longer than deep. Scales rather strongly denticulate, very small on pectoral region, 32-34  $\frac{4}{10-11}$ ; lateral lines  $\frac{21-23}{10-14}$ . Grey-

Fig. 161.

*Tilapia simotes.*

Type (Ann. Mus. Genova, 1911).

brown to blackish on the body and fins; traces of black cross-bands and a black bar below the eye may be present; anal frequently with two or three bright ocellar spots.

Total length 110 millim.

Victoria Nile.—Types in Genoa Museum.

1-4. Types.	Jinja, Ripon Falls.	Dr. E. Bayon (C.);
		Genoa Museum (P.).
5-7. Types.	Kakindu, Victoria Nile.	„ „
8. Skel.	„ „	„ „

#### 75. TILAPIA LIVINGSTONII.

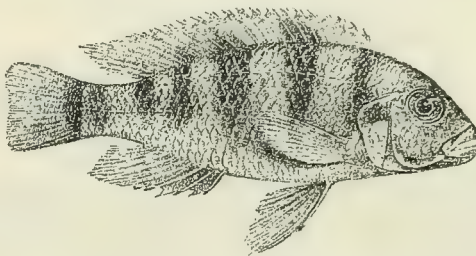
Bouleng. Proc. Zool. Soc. 1899, p. 134, pl. xi. fig. 2; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 341.

Depth of body scarcely greater than length of head, 3 times in total



length. Head twice as long as broad, upper profile forming a strong curve; snout broader than long, shorter than postocular part of head, as long as eye, which is  $3\frac{1}{2}$  times in length of head and slightly exceeds interorbital width or least depth of præorbital; mouth moderately large,  $\frac{3}{4}$  width of head, extending to below anterior border of eye; teeth in 6 series, outer moderately large, 40 in upper jaw; 3 or 4 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, 8 on lower part of anterior arch. Dorsal XVII 9; last spine longest, not quite  $\frac{1}{2}$  length of head,  $\frac{2}{3}$  longest soft rays. Anal III 8;

Fig. 162.

*Tilapia livingstonii.*

Type (P. Z. S. 1899).

third spine a little shorter than last dorsal. Pectoral  $\frac{3}{4}$  length of head, not extending to origin of anal. Ventral reaching origin of anal. Caudal rounded. Caudal peduncle as long as deep. Scales strongly denticulate, 33  $\frac{5-6}{12}$ ; lateral lines  $\frac{22-23}{11-12}$ . Brownish above, with 7 dark bars, the first on the nape, the penultimate on the caudal peduncle, the last at the root of the caudal fin; two round white spots on the anal fin.

Total length 73 millim.

Zambesi (?).

1. Type.

Zambesi Expedition.

Dr. Livingstone (C.);  
Earl Russell (P.).

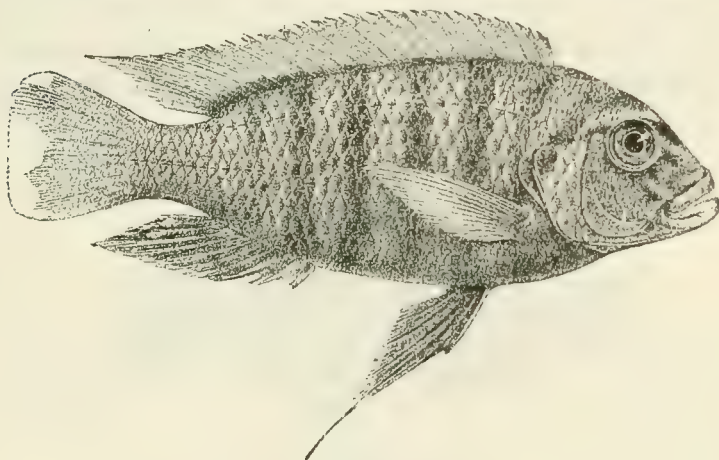
#### 76. TILAPIA ZEBRA.

Bouleng. Proc. Zool. Soc. 1899, p. 137, pl. xii. fig. 2; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 343.

Depth of body  $2\frac{3}{4}$  times in total length, length of head  $3\frac{1}{5}$  times. Head  $1\frac{2}{3}$  times as long as broad; snout with straight upper profile, much broader than long, a little shorter than postocular part of head,  $1\frac{1}{3}$  diameters of eye, which is 4 times in length of head,  $1\frac{1}{3}$  times in

interorbital width, and a little exceeds least depth of præorbital; mouth rather large,  $\frac{3}{4}$  width of head, extending to below anterior border of eye; teeth small, in 4 or 5 series, 52 in outer series of upper jaw; 5 or 6 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 12 on lower part of anterior arch. Dorsal XVIII 8; last spine longest,  $\frac{1}{2}$  length of head,  $\frac{3}{5}$  middle soft rays, which are produced. Anal III 8; third spine nearly as long as last

Fig. 163.

*Tilapia zebra.*

Type (P. Z. S. 1899).

dorsal. Pectoral as long as head, not extending to vertical of origin of anal. Ventral produced into a filament, extending beyond origin of anal. Caudal rounded (?), densely scaled at the base. Caudal peduncle a little deeper than long. Scales finely denticulate,  $31\frac{6-7}{16}$ ; lateral lines  $\frac{23-24}{10-11}$ ; scales on occiput, nape, breast, and belly very small. Grey, with 6 dark brown bars; a crescentic dark brown band on the forehead, from eye to eye, followed by a second farther back, and a third in front of the dorsal; vertical fins grey; three round white spots on the posterior part of the anal; ventrals blackish.

Total length 105 millim.

Lake Nyassa.

1. Type.

L. Nyassa.

Miss M. Woodward (C.);

Miss S. C. McLaughlin (P.).

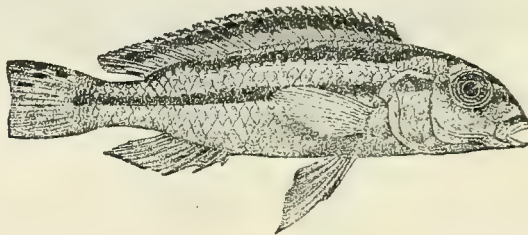
## 77. TILAPIA AURATA.

*Chromis auratus*, Bouleng. Ann. & Mag. N. H. (6) xix. 1897, p. 155.

*Tilapia aurata*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 4, and Proc. Zool. Soc. 1899, p. 137, pl. xii. fig. 3; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 343.

Depth of body  $3\frac{2}{3}$  times in total length, length of head  $3\frac{1}{2}$  times. Head twice as long as broad, with strongly curved upper profile; snout as long as broad, shorter than postocular part of head; eye 4 times in length of head, slightly greater than interorbital width, equal to least depth of præorbital; mouth small,  $\frac{3}{5}$  width of head, extending to between nostril and eye; teeth rather small, in 5 or 6 series, 42 in outer series of upper jaw; 3 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers very short, 8 on lower part

Fig. 164.



*Tilapia aurata*.  
Type (P. Z. S. 1899)

of anterior arch. Dorsal XIX 6; spines subequal from the fourth,  $\frac{1}{3}$  length of head,  $\frac{4}{5}$  longest soft rays. Anal III 6; third spine as long as longest dorsals. Pectoral  $\frac{3}{4}$  length of head, not extending to origin of anal. Ventral reaching vent. Caudal truncate, densely scaled. Caudal peduncle a little longer than deep. Scales finely denticulate,  $34\frac{5-6}{12}$ ; lateral lines  $\frac{24}{12}$ . Bright golden yellow, with three black stripes, one along the side of the body from the eye to the base of the caudal, a second above the upper lateral line from the occiput to the caudal peduncle, and a third along the dorsal fin; two curved black bands across the snout from eye to eye; a few black spots on the upper part of the caudal fin.

Total length 75 millim.

Lake Nyassa.

1. Type. Monkey Bay, W. Coast of L. Nyassa. G. H. Pigott, Esq. (P.).

## 78. TILAPIA POLYACANTHUS.

Bouleng. Ann. Mus. Congo, Zool. i. p. 124, pl. xlv. fig. 6 (1899), and Poiss. Bass. Congo, p. 471 (1901) ; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 326.

Depth of body nearly equal to length of head, 3 to  $3\frac{1}{2}$  times in total length. Occiput somewhat humped in the male. Snout with straight or convex upper profile, as long as postocular part of head ; eye  $3\frac{2}{3}$  to 4 times in length of head, equal to interorbital width and to præorbital depth ; mouth  $\frac{2}{3}$  to  $\frac{4}{5}$  width of head, extending to between nostril and eye ; upper lip much developed on the side ; teeth in 5 or 6 series, outer rather large, 44 to 50 in upper jaw ; 3 or 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 9 or 10 on lower part of anterior arch. Dorsal XVIII-XIX 8-9 ; spines subequal from the fifth or sixth,  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head ; longest

Fig. 165.

*Tilapia polyacanthus.*

Type (A. M. C.).  $\frac{5}{8}$ .

soft rays  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 7-8 ; third spine a little longer than longest dorsal. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not extending to vertical of origin of anal. Ventral not reaching vent. Caudal rounded. Caudal peduncle as long as deep or a little longer than deep. Scales denticulate, 32-34  $\frac{3-4}{15}$  ; lateral lines  $\frac{22-24}{8-12}$ . Dark olive-brown ; gill-cover, dorsal, anal, and caudal fins edged with blackish ; ventrals blackish.

Total length 80 millim.

Lake Mweru.—Type in Congo Museum, Tervueren.

1-3. Ad. & yg.

Pweto, L. Mweru.

Dr. L. Stappers (C.).

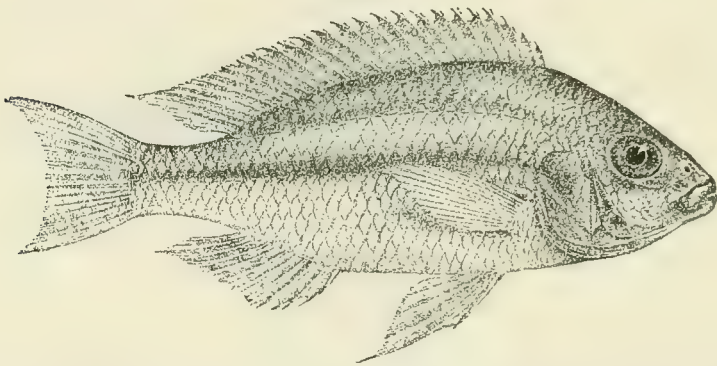
## 79. TILAPIA PLEUROTÆNIA.

Bouleng. Ann. & Mag. N. H. (7) vii. 1901, p. 4, Poiss. Bass. Congo, p. 474 (1901), and Tr. Zool. Soc. xvi. 1901, p. 157, pl. xviii. fig. 4 ; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 333.



Depth of body  $2\frac{1}{2}$  to 3 times in total length, length of head 3 to  $3\frac{1}{2}$  times. Head 2 to  $2\frac{1}{3}$  times as long as broad; snout with straight upper profile, as long as broad, as long as postocular part of head; eye  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times in length of head, equal to or a little greater than inter-orbital width, and greater than præorbital depth; mouth rather small,  $\frac{1}{2}$  to  $\frac{3}{5}$  width of head, extending to below nostril or to between nostril and eye; teeth rather small, in 3 or 4 series, 30 to 40 in outer series of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, 10 to 12 on lower part of anterior arch. Dorsal XV-XVIII 11-12; spines increasing in length to the last, which is a little less than  $\frac{1}{2}$  length of head; longest soft rays  $\frac{2}{3}$  length of head. Anal III 8-10; third spine a little shorter than last

Fig. 166.



*Tilapia pleurotaenia.*  
Type (Tr. Z. S. 1901).

dorsal. Pectoral a little shorter than head, not reaching origin of anal. Ventral reaching vent or a little beyond. Caudal with rather deep notch; rays free from scales. Caudal peduncle  $1\frac{1}{2}$  times as long as deep. Scales cycloid or very finely denticulate, 32-35  $\frac{3\frac{1}{2}-4}{11-12}$ ; lateral lines  $\frac{22-24}{10-15}$ . Brownish above, whitish beneath; a blackish lateral band along the body, from the operculum to the root of the caudal; fins greyish, soft dorsal and caudal with small round white spots.

Total length 110 millim.

Lake Tanganyika and Rusisi River.

1-6. Types.	N. end of L. Tanganyika.	Prof. J. E. S. Moore (C.).
7. Skel.	" "	"
8-12. Types.	Rusisi R.	"

## 80. TILAPIA JOHNSTONII.

*Chromis johnstoni*, Günth. Proc. Zool. Soc. 1893, p. 622, pl. liv. fig. A.

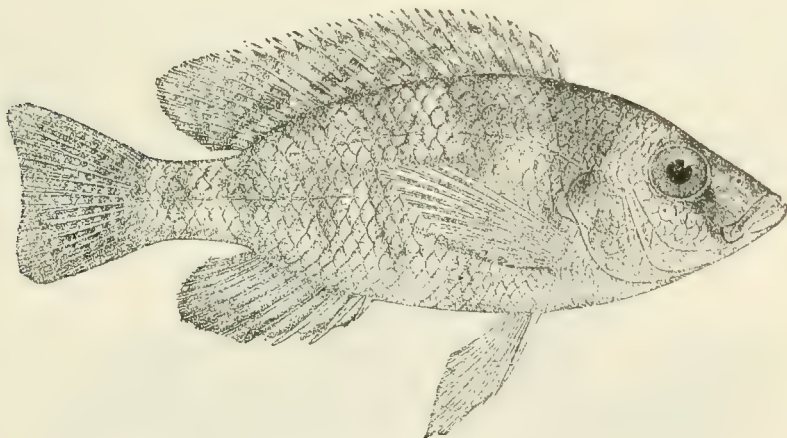
*Chromis subocularis*, part., Günth. t. c. p. 621, fig. B.

*Tilapia johnstoni*, part., Bouleng. Tr. Zool. Soc. xv. 1898, p. 4, and Proc. Zool. Soc. 1899, p. 130.

*Astatotilapia johnstoni*, part., Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 303.

Depth of body nearly equal to length of head,  $2\frac{3}{4}$  to  $3\frac{1}{4}$  times in total length. Head twice as long as broad; snout rounded, with straight upper profile, as long as broad, as long as postocular part of head; eye  $3\frac{1}{2}$  to 4 times in length of head, equal to or somewhat greater than interorbital width, exceeding præorbital depth; mouth rather small,  $\frac{3}{5}$  width of head, extending to between nostril and eye; teeth in 4 or 5

Fig. 167.

*Tilapia johnstonii*.

Type, after Günther (P. Z. S. 1893).  $\frac{2}{5}$ .

series, outer moderately large and bicuspid, 40 to 50 in upper jaw, separated by a considerable interspace from the others, which are very minute and mostly conical; 3 or 4 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, 11 or 12 on lower part of anterior arch. Dorsal XV–XVI 10–11; last spine longest,  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head,  $\frac{3}{5}$  to  $\frac{3}{4}$  longest soft rays. Anal III 8–9; third spine a little shorter than longest dorsal. Pectoral as long as or a little shorter than head, reaching vertical of origin of anal. Ventral reaching vent or anal. Caudal slightly notched, with rounded corners. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. Scales distinctly denticulate, 32–33  $\frac{3-4}{11-13}$ ; lateral lines  $\frac{20-26}{14-16}$ . Pale olive, with 6 or 7 more or less

regular dark bars, which may be accompanied by large blackish spots; a dark opercular spot; dorsal with oblique dark streaks and rows of small pale spots, or with regular series of ocellar spots between the rays; caudal with small pale spots.

Total length 140 millim.

Lake Nyassa.

- |   |            |                           |
|---|------------|---------------------------|
| 1. Type.  | L. Nyassa. | Sir H. H. Johnston (P.).  |
| 2. One of the types of<br><i>C. subocularis</i> . | „          | „                         |
| 3. Ad.  | „          | Capt. E. L. Rhoades (P.). |

### 81. TILAPIA TETRASTIGMA.

*Chromis tetrastigma*, Günth. Proc. Zool. Soc. 1893, p. 623, pl. liv. fig. C.

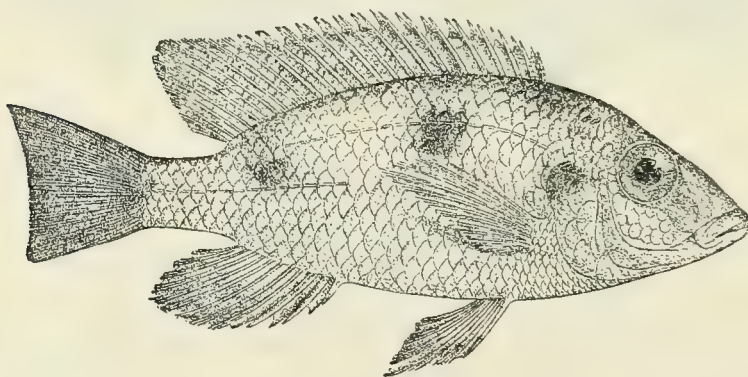
*Tilapia tetrastigma*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 4.

*Tilapia johnstoni*, part., Bouleng. Proc. Zool. Soc. 1899, p. 130.

*Astatotilapia johnstoni*, part., Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 303.

Depth of body nearly equal to length of head,  $2\frac{3}{4}$  to  $2\frac{3}{4}$  times in total length. Head twice as long as broad; snout rounded, with straight

Fig. 168.



*Tilapia tetrastigma*.

Type, after Günther (P. Z. S. 1893).  $\frac{7}{8}$ .

upper profile, as long as broad, as long as postocular part of head; eye 3 to  $3\frac{1}{2}$  times in length of head, equal to interorbital width, exceeding præorbital depth; mouth rather small,  $\frac{3}{5}$  width of head, extending to between nostril and eye; teeth in 4 or 5 series, outer small, 56 to 60 in upper jaw, separated by a considerable interspace from the others, which are very minute and mostly conical; 3 or 4 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short,

10 or 11 on lower part of anterior arch. Dorsal XIV–XV 10–11; last spine longest,  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head, about  $\frac{3}{4}$  longest soft rays. Anal III 8–9; third spine a little shorter than longest dorsal. Pectoral as long as head, reaching vertical of origin of anal. Ventral reaching vent or anal. Caudal slightly notched, pointed above, rounded below. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. Scales distinctly denticulate, 31–32  $\frac{3}{12}$ ; lateral lines  $\frac{20-23}{13-16}$ . Brownish above, white below, with or without 8 or 9 more or less distinct dark bars; four round blackish spots on each side, the first on the operculum, the fourth at the base of the caudal fin; a dark bar below the anterior border of the eye; fins brown, spinous dorsal edged with darker; regular series of ocellar spots between the dorsal rays; caudal with small pale spots.

Total length 110 millim.

Lake Nyassa.

1–4. Types.	L. Nyassa.	Sir H. H. Johnston (P.).
5–14. Types.	Zomba.	„
15. Yg.	Fort Johnston.	„
16–17. Hgr. & yg.	Between Kondowe and Karanga.	A. Whyte, Esq. (C.); Sir H. H. Johnston (P.).

## 82. TILAPIA KIRKII.

*Chromis kirkii*, Günth. Proc. Zool. Soc. 1893, p. 624, pl. lvi. fig. A.

*Ctenochromis kirkii*, Pfeff. Thierw. O.-Afr., Fische, p. 19 (1896).

*Tilapia kirkii*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 4, and Proc. Zool. Soc. 1899, p. 128.

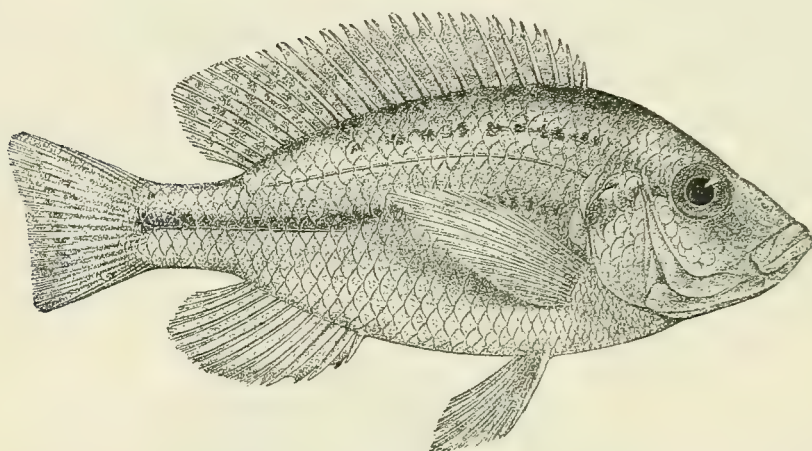
*Tilapia strigigena*, part., Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 336.

Depth of body  $2\frac{3}{5}$  to  $2\frac{4}{5}$  times in total length, length of head 3 to  $3\frac{1}{4}$  times. Head a little over twice as long as broad; snout rounded, with straight upper profile, as long as broad, as long as postocular part of head; eye  $3\frac{1}{2}$  to 4 times in length of head, equal to or a little less than interorbital width, equal to or a little greater than least præorbital depth; mouth rather small,  $\frac{3}{5}$  to  $\frac{2}{3}$  width of head, extending to below nostril or between nostril and eye; teeth moderate, in 3 or 4 series, 30 to 60 in outer series of upper jaw; 3 series of scales on the cheek, width of scaly part  $\frac{2}{3}$  to  $\frac{3}{4}$  diameter of eye. Gill-rakers short, 11 or 12 on lower part of anterior arch. Dorsal XV–XVII 9–11; spines increasing in length to the last, which measures about  $\frac{1}{2}$  length of head; soft rays not or but little longer. Anal III 8–10; third spine a little



shorter than longest dorsal. Pectoral as long as head or a little shorter, reaching origin of anal or not quite so far. Ventral reaching vent or a little beyond. Caudal feebly emarginate, the rays covered with small scales. Caudal peduncle  $1\frac{1}{4}$  to  $1\frac{1}{2}$  times as long as deep. Scales finely denticulate, 33-35  $\frac{3\frac{1}{2}-4\frac{1}{2}}{11-12}$ ; lateral lines  $\frac{20-24}{12-17}$ . Brownish above, silvery beneath, with a blackish lateral stripe from the opercular spot to the root of the caudal; a second stripe may be present between the upper lateral line and the dorsal fin; both these stripes may be broken up

Fig. 169.

*Tilapia kirkii*.

Type, after Günther (P. Z. S. 1893).  $\frac{6}{7}$ .

into spots; soft dorsal and caudal with small dark and light spots forming more or less regular series.

Total length 150 millim.

Lake Nyassa and Upper Shiré.

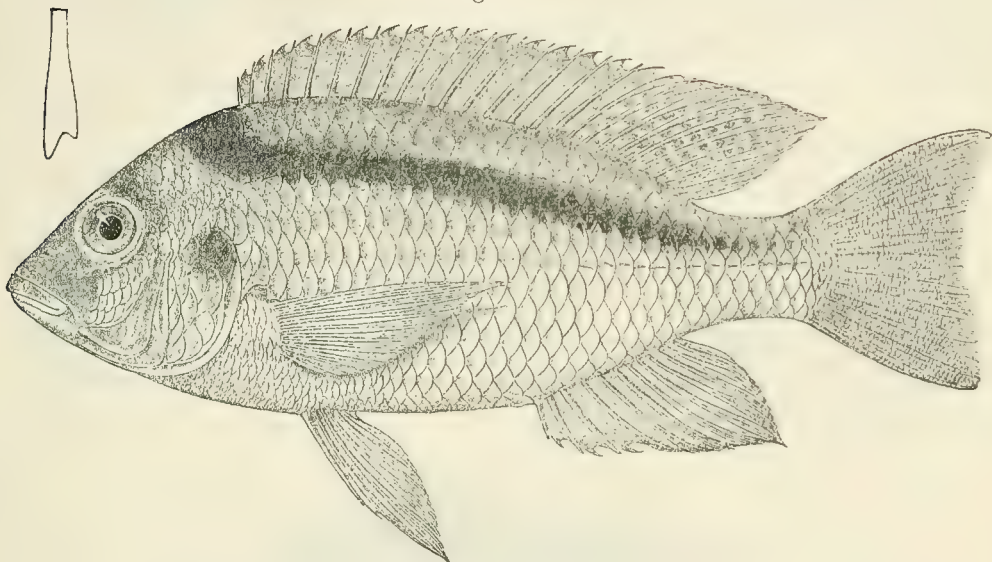
1-5. Types.	Lake Nyassa and Upper Shiré.	A. Whyte, Esq. (C.); Sir H. H. Johnston (P.).
6. Ad.	L. Nyassa.	Capt. E. L. Rhoades (P.).
7. Skel.	"	"
8-17. Yg.	Fort Johnston.	Sir H. H. Johnston (P.).
18-22. Ad.	Upper Shiré.	Dr. P. Rendell (C.); Sir H. H. Johnston (P.).
23-25. Yg.	Zomba, between the Upper Shiré and L. Shirwa.	A. Whyte, Esq. (C.); Sir H. H. Johnston (P.).

## 83. TILAPIA LATERISTRIGA.

*Chromis lateristriga*, part., Günth. Proc. Zool. Soc. 1864, p. 312.

Depth of body  $2\frac{1}{2}$  to 3 times in total length, length of head 3 to  $3\frac{1}{4}$  times. Head 2 to  $2\frac{1}{4}$  times as long as broad; snout rounded, with straight upper profile, as long as broad, as long as postocular part of head; eye 3 (young) to 4 times in length of head, 1 to  $1\frac{1}{4}$  times in interorbital width, equal to præorbital depth in adult; snout moderate,

Fig. 170.

*Tilapia lateristriga*.

L. Nyassa.  $\frac{2}{3}$ .

$\frac{3}{5}$  to  $\frac{2}{3}$  width of head, extending to between nostril and eye; teeth rather small, in 3 to 5 series, 40 to 70 in outer series of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part equal to or a little less than diameter of eye. Gill-rakers rather short, 9 to 13 on lower part of anterior arch. Dorsal XV-XVI 10-12; spines increasing in length to the last, which is  $\frac{1}{3}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head in females, produced and as long as head in males. Anal III 8-10; third spine  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head. Pectoral as long as or a little longer than head, reaching or nearly reaching origin of anal. Ventral reaching vent or anal. Caudal scaled, densely in large specimens, feebly but distinctly emarginate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. Scales very finely denticulate, 32-33  $\frac{3-3\frac{1}{2}}{11-13}$ ; lateral

lines  $\frac{20-24}{11-13}$ . Brownish above, with a black band along each side of the back, from the nape, where it usually unites with its fellow in front of the dorsal fin, to the caudal peduncle; this band sometimes broken up into spots; a dark bar sometimes present between the eyes; fins greyish or brownish in females, dorsal with round red spots, darker in males, in which the dorsal and anal are edged with yellowish.

Total length 185 millim.

Lake Nyassa.

1. Skin, type.	Lake Nyassa.	Sir J. Kirk (C.).
2-21. Ad., hgr., & yg.	„	Capt. E. L. Rhoades (P.).

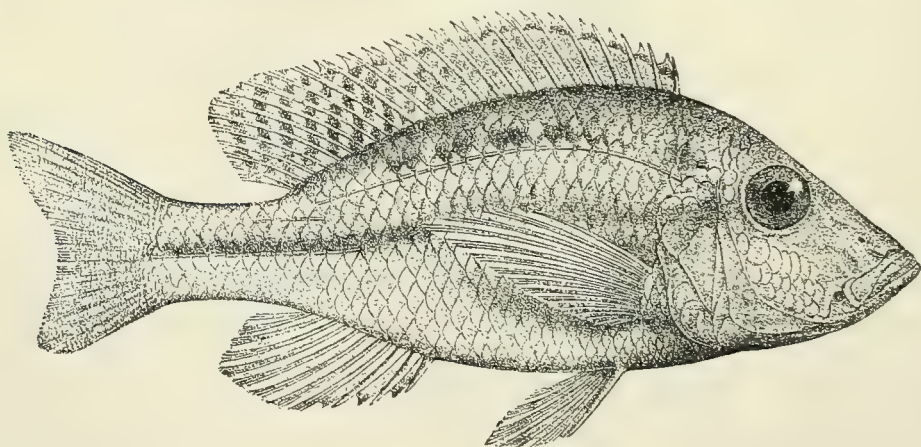
#### 84. TILAPIA LETHRINUS.

*Chromis lethrinus*, Günth. Proc. Zool. Soc. 1893, p. 622, pl. lv. fig. A.

*Tilapia lethrinus*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 4, and Proc. Zool. Soc. 1899, p. 129; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 337.

Depth of body equal to or a little greater than length of head,  $2\frac{1}{2}$  to  $2\frac{3}{4}$  times in total length. Head 2 to  $2\frac{1}{3}$  times as long as broad; snout with straight upper profile, longer than broad, as long as or a little longer than postocular part of head; eye 4 to  $4\frac{1}{2}$  times in length of

Fig. 171.



*Tilapia lethrinus*.

Type, after Günther (P. Z. S. 1893).  $\frac{5}{6}$ .

head, equal to interorbital width and less than præorbital depth; mouth small, about  $\frac{1}{2}$  width of head, extending to between nostril and eye; teeth very small, in 3 or 4 series, about 80 in outer series of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part equal to



diameter of eye. Gill-rakers large, falciform, 8 to 10 on lower part of anterior arch. Dorsal XV–XVI 10–11; last spine longest,  $\frac{2}{5}$  to  $\frac{3}{5}$  length of head, about  $\frac{3}{4}$  length of soft rays. Anal III 8–9; third spine shorter and stronger than longest dorsal. Pectoral a little shorter than head, reaching vertical of origin of anal. Ventral reaching vent or origin of anal. Caudal densely scaled, rather deeply emarginate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. Scales finely denticulate, 33–35  $\frac{3-4}{10-11}$ ; lateral lines  $\frac{26}{14-19}$ . Silvery, brownish on the back; some blackish spots or a black stripe above the upper lateral line; a blackish stripe may be present along the side of the body and above the lower lateral line; dorsal and caudal chequered with blackish between the rays, the spots sometimes forming oblique stripes on the soft dorsal.

Total length 195 millim.

Lake Nyassa.

1. Type.	L. Nyassa.	Sir H. H. Johnston (P.).
2. Ad.	Between Kondowe and Karonga.	A. Whyte, Esq. (C.); Sir H. H. Johnston (P.).
3–4. Ad.	L. Nyassa.	Prof. J. E. S. Moore (C.).
5. Skel.	"	"
6. Hgr.	"	Capt. E. L. Rhoades (P.).

#### 85. TILAPIA ROSTRATA.

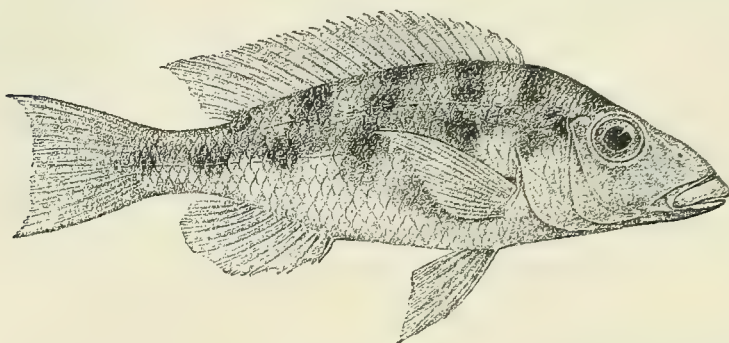
Bouleng. Proc. Zool. Soc. 1899, pl. xii. fig. 1; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 344.

Depth of body  $2\frac{4}{5}$  to  $3\frac{1}{5}$  times in total length, length of head  $2\frac{3}{4}$  to  $2\frac{4}{5}$  times. Head  $2\frac{1}{2}$  times as long as broad; snout long and pointed, with slightly convex upper profile, much longer than broad, longer than postocular part of head, twice as long as eye, which is  $4\frac{1}{2}$  to  $4\frac{2}{3}$  times in length of head and equals  $\frac{2}{3}$  or once interorbital width or præorbital depth; mouth  $\frac{2}{5}$  to  $\frac{2}{3}$  width of head, extending to between nostril and eye; teeth small, in 4 series, 54 to 70 in outer series of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part equal to or a little less than diameter of eye. Gill-rakers rather long, 16 to 21 on lower part of anterior arch. Dorsal XV–XVI 11; last spine longest,  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head, a little shorter than soft rays. Anal III 9; third spine stronger but a little shorter than last dorsal. Pectoral  $\frac{2}{3}$  length of head, not extending to origin of anal. Ventral reaching vent. Caudal



rather deeply emarginate. Caudal peduncle  $1\frac{1}{2}$  times as long as deep. Scales finely denticulate, 34-35  $\frac{4-5}{14}$ ; lateral lines  $\frac{23-24}{19-21}$ . Pale brown above, silvery white beneath; five dark brown cross-bars, broken up

Fig. 172.

*Tilapia rostrata.*

Type (P. Z. S. 1899).

into large spots; a small dark brown opercular spot; a large dark brown spot at base of caudal; fins white, dorsal sometimes with small round dark spots.

Total length 210 millim.

Lake Nyassa.

- |          |            |                             |
|----------|------------|-----------------------------|
| 1. Type. | L. Nyassa. | Miss M. Woodward (C.);      |
|          |            | Miss S. C. McLaughlin (P.). |
| 2. Ad.   | „          | Prof. J. E. S. Moore (C.).  |

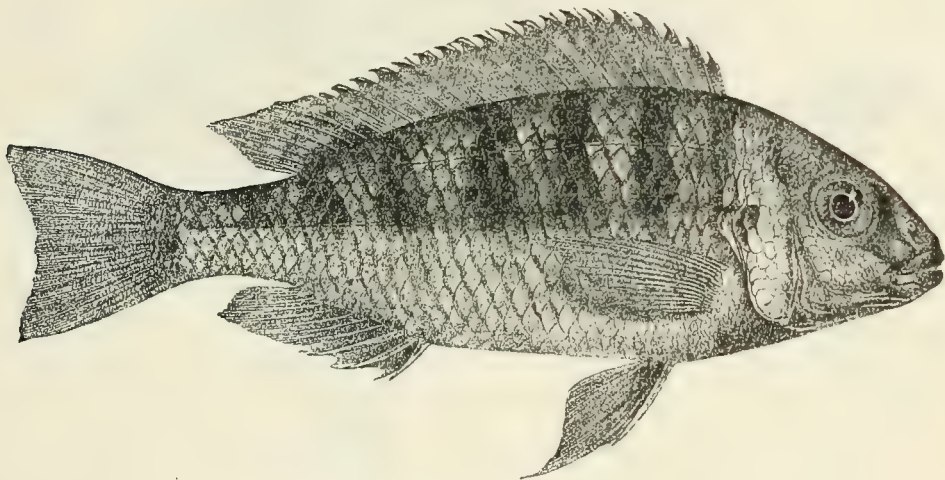
#### 86. TILAPIA DARDENNIL.

Bouleng. Tr. Zool. Soc. xv. 1899, p. 92, pl. xx. fig. 1, Ann. Mus. Congo, Zool. i. p. 150, pl. lv. fig. 2 (1900), and Poiss. Bass. Congo, p. 472 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 342; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 572.

Depth of body  $2\frac{4}{5}$  to  $3\frac{1}{3}$  times in total length, length of head 3 to  $3\frac{1}{2}$  times. Head 2 to  $2\frac{1}{3}$  times as long as broad, with strongly curved upper profile; snout rounded, as long as broad or a little broader than long, as long as or a little longer than postocular part of head, 1 to  $1\frac{1}{2}$  times as long as eye, which is  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times in length of head, equals or nearly equals interorbital width and exceeds least præorbital depth; mouth moderate,  $\frac{2}{3}$  to  $\frac{2}{5}$  width of head, extending to between nostril and eye; teeth small, in 4 or 5 series, 50 (young) to 68 in outer series

of upper jaw; 4 or 5 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, 12 to 14 on lower part of anterior arch. Dorsal XVIII–XX 9–11; sixth to ninth spines longest, or spines subequal from the sixth,  $\frac{2}{5}$  to nearly  $\frac{1}{2}$  length of head, but little shorter than longest soft rays. Anal III 8–9; third spine as long as and much stronger than longest dorsal. Pectoral as long as head or a little shorter, not extending to vertical of origin of anal. Ventral reaching vent or anal, or not quite so far. Caudal feebly but very

Fig. 173.

*Tilapia dardennii.*Type (Tr. Z. S. 1899).  $\frac{5}{8}$ .

distinctly emarginate. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{3}{4}$  times as long as deep. Scales mostly denticulate, 35–38  $\frac{4-5}{10-11}$ ; lateral lines  $\frac{24-28}{15-20}$ . Yellowish olive above, silvery beneath; 10 or 11 dark bars across the back, the first between the eyes, sometimes replaced by transverse series of large squarish spots; yellow lines may be present along the series of scales; fins yellowish, dorsal with olive marblings; pectoral and anal red at the base.

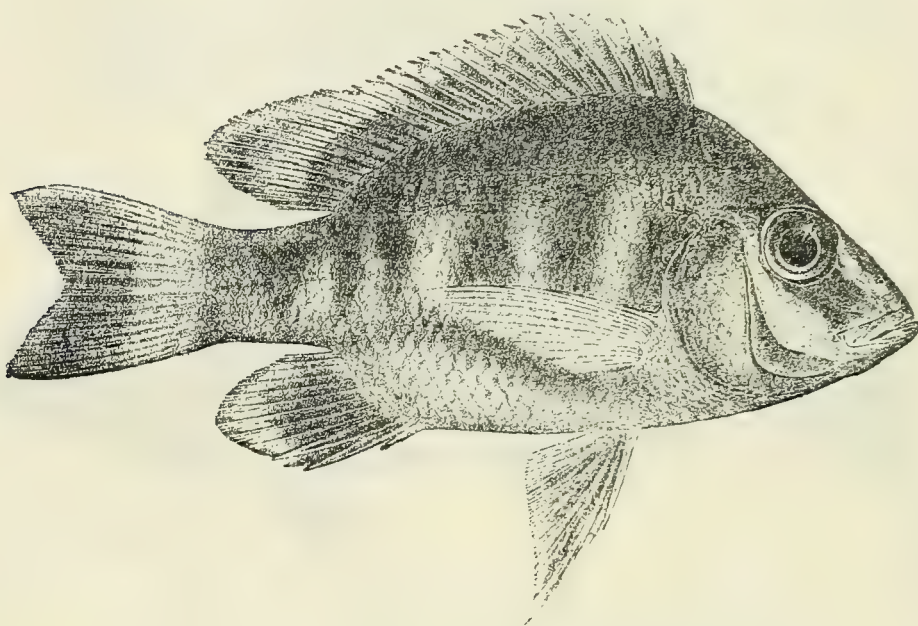
Total length 230 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

- |                      |          |                            |
|----------------------|----------|----------------------------|
| 1. One of the types. | Moliro.  | Capt. Lemaire (C.).        |
| 2. Ad.               | „        | Dr. L. Stappers (C.)       |
| 3–5. Ad.             | Kibwesi. | Prof. J. E. S. Moore (C.). |
| 6. Ad.               | Kalambo. | „                          |

7-10. Ad.	Niamkolo,	Dr. W. A. Cunningham.
11. Skel.	"	"
12. Hgr.	Uvira.	Dr. L. Stappers (C.).
13-14. Ad. & hgr.	Kilewa Bay.	"
15-23. Yg.	Mouth of Lukuga R.	"

Fig. 174.

*Tilapia oligacanthus.*After Steindachner (*l. c.*).  $\frac{5}{8}$ .

## 87. TILAPIA OLIGACANTHUS.

Bleek. Versl. Ak. Amsterd. ii. 1868, p. 309, and Poiss. Madag. p. 11, pl. iv. fig. 1 (1874); Bouleng. Proc. Zool. Soc. 1899, p. 138.

*Ptychochromis oligacanthus*, Steind. Sitzb. Ak. Wien, lxxxii. i. 1880, p. 249, pl. i.; Sauv. Hist. Madag., Poiss. p. 439, pls. xlv. fig. 4, xlv. B, fig. 1, and xlv. fig. 1 (1891); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 347 (part.), and Bull. Mus. Paris, 1907, p. 324.

*Ptychochromis grandidieri*, Sauv. Bull. Soc. Philom. (7) vi. 1882, p. 174, and Hist. Madag., Poiss. p. 441, pls. xlv. fig. 3 and xlv. A, fig. 5.

*Ptychochromis madagascariensis*, Sauv. Hist. Madag., Poiss. p. 442, pls. xliii. fig. 4 and xlv. A, fig. 6.

*Tilapia madagascariensis*, Bouleng. t. c. p. 138.

*Tilapia grandidieri*, Bouleng. t. c. p. 139.

Depth of body 2 to  $2\frac{1}{3}$  times in total length, length of head  $2\frac{2}{3}$  to 3



times. Head 2 to  $2\frac{1}{4}$  times as long as broad; snout rounded, with straight or slightly convex upper profile, as long as or slightly longer than broad, as long as or a little shorter than postocular part of head; eye shorter than snout,  $3\frac{1}{2}$  to 4 times in length of head, equal to or a little less than interorbital width, exceeding least depth of præorbital; mouth moderate, about  $\frac{2}{3}$  width of head, extending to between nostril and eye, end of maxillary exposed; teeth in 3 to 5 series, outer moderately large, 46 to 50 in upper jaw; 4 or 5 series of scales on the cheek, width of scaly part equal to or a little less than diameter of eye. Gill-rakers short, 12 or 13 on lower part of anterior arch. Dorsal XIII-XIV 10-13; last spine longest,  $\frac{2}{5}$  to  $\frac{3}{5}$  length of head; longest soft rays at least  $\frac{2}{3}$  length of head, sometimes much produced and longer than head. Anal III 7-9; third spine longer than last dorsal. Pectoral as long as or a little shorter than head, not extending to vertical of origin of anal. Ventral reaching vent or origin of anal. Caudal more or less strongly emarginate. Caudal peduncle as long as deep or slightly deeper than long. Scales finely denticulate, 32-34  $\frac{3\frac{1}{2}-4\frac{1}{2}}{12-15}$ ; lateral lines  $\frac{20-22}{12-15}$ . Uniform brown, or brownish above with five dark bars or two or three dark spots on each side.

Total length 220 millim.

Madagascar.—Types in Leyden Museum.

1-3. Ad. & hgr.	Tamatave.	Rev. W. D. Cowan (C.).
4. Skel.	"	"
5-7. Ad.	Mahanova.	
8, 9. Ad. & hgr.	Imerina.	Rev. R. Baron (C.).
10. Ad.	Fenerive.	Paris Museum (E.).
11. Ad.	L. Tongobory.	"

#### 88. TILAPIA BETSILEANA.

Bouleng. Proc. Zool. Soc. 1899, p. 139, fig.

*Ptychochromis oligacanthus*, part., Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 347.

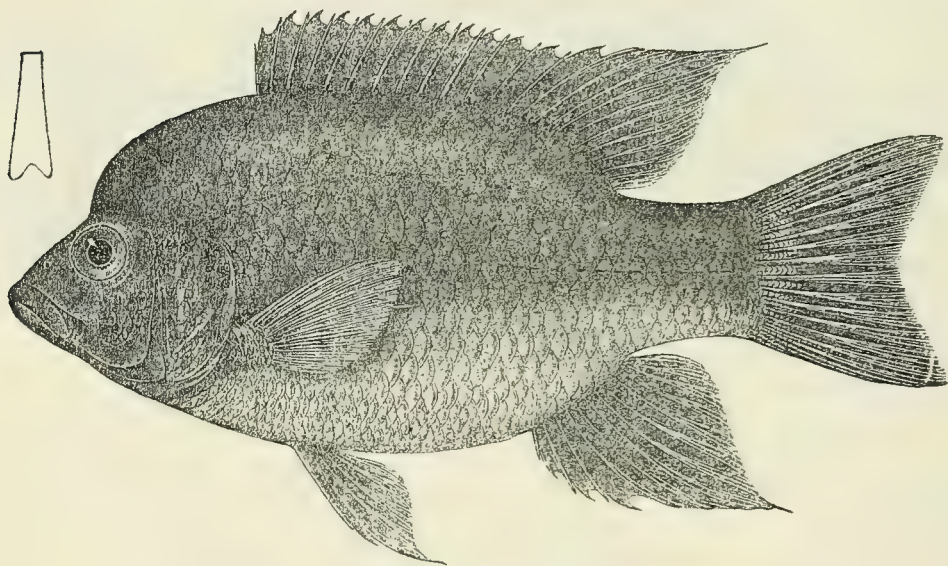
*Ptychochromis betsileanus*, Pellegr. Bull. Mus. Paris, 1907, p. 323.

Depth of body 2 to  $2\frac{1}{4}$  times in total length, length of head  $2\frac{4}{5}$  to  $3\frac{1}{2}$  times. Head twice as long as broad; a more or less developed frontal gibbosity in adult specimens; snout rounded, with straight or slightly convex upper profile, nearly as long as broad, as long as or a little



shorter than postocular part of head; eye shorter than snout,  $3\frac{1}{2}$  to  $4\frac{3}{4}$  times in length of head,  $1\frac{1}{3}$  to 2 times in interorbital width, exceeding least depth of præorbital; mouth moderate, about  $\frac{2}{3}$  width of head, extending to below anterior border of eye, or nearly as far; end of maxillary exposed; teeth in 3 to 5 series, outer moderately large, 36 to 40 in upper jaw; 4 or 5 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 10 or 11 on lower part of anterior arch. Dorsal XIII–XV 12–14; spines subequal, or last

Fig. 175.

*Tilapia betsileana.*Madagascar.  $\frac{3}{4}$ .

longest,  $2\frac{1}{2}$  to 3 times in length of head; some of the soft rays produced, as long as or longer than head. Anal III 10–12; third spine longer than last dorsal. Pectoral  $\frac{2}{3}$  to once length of head, not extending to vertical of origin of anal. Ventral reaching vent. Caudal emarginate. Caudal peduncle slightly deeper than long. Scales finely denticulate, 33–36  $\frac{4-4\frac{1}{2}}{1+16}$ ; lateral lines  $\frac{21}{14}$ . Uniform dark brown; pectoral fins yellowish.

Total length 200 millim.

Madagascar.

1–2. Types.

Betsileo.

Rev. W. D. Cowan (C.).

3. Ad.

Madagascar.

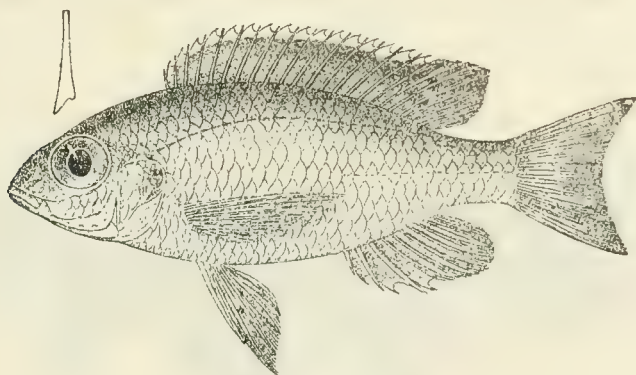
Paris Museum (E.).

## 89. TILAPIA MACROPHTHALMA.

Bouleng. Ann. & Mag. N. H. (8) ii. 1908, p. 242.

Depth of body nearly equal to length of head,  $2\frac{4}{5}$  to 3 times in total length. Head  $2\frac{1}{4}$  to  $2\frac{1}{2}$  times as long as broad; snout rounded, with very convex upper profile, as long as broad or a little broader than long, as long as postocular part of head; eye longer than snout,  $2\frac{1}{2}$  to  $2\frac{3}{5}$  times in length of head, exceeding interorbital width and præorbital depth; mouth rather small,  $\frac{3}{5}$  to  $\frac{2}{3}$  width of head, extending to between nostril and eye; teeth in 2 series, outer very small and slender, about 60 in upper jaw; 2 or 3 series of scales on the cheek, width of scaly part about  $\frac{1}{2}$  diameter of eye. Gill-rakers short, 11 or 12 on lower part of

Fig. 176.

*Tilapia macrophthalmus.*

Type.

anterior arch. Dorsal XV–XVII 10–11; last spine longest, about  $\frac{1}{2}$  length of head and  $\frac{3}{4}$  longest soft rays. Anal III 8–9; third spine as long as longest dorsal. Pectoral a little longer than head, reaching vertical of origin of anal. Ventral reaching vent or anal. Caudal deeply emarginate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. Scales finely denticulate, 32–34  $\frac{3}{12}$ ; lateral lines  $\frac{23-29}{13-17}$ . Brownish above, silvery white beneath, uniform or with very indistinct numerous darker vertical bars; a brown opercular spot; spinous dorsal with a dark and light edge.

Total length 80 millim.

Lake Nyassa.

1–5. Types.

L. Nyassa.

Capt. E. L. Rhoades (P.).

6. Skel.

"

"

7. Ad,

Kondowe to Karonga.

A. Whyte, Esq. (C.); Sir H.

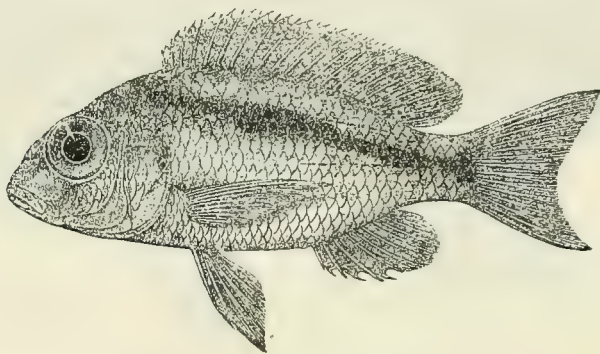
H. Johnston (P.).

## 90. TILAPIA BREVIS.

Bouleng. Ann. & Mag. N. H. (8) ii. 1908, p. 243.

Depth of body  $2\frac{1}{2}$  times in total length, length of head  $2\frac{2}{3}$  times. Head twice as long as broad; snout rounded, with very convex upper profile, broader than long, shorter than postocular part of head; eye longer than snout,  $2\frac{1}{2}$  times in length of head, exceeding interorbital width and præorbital depth; mouth rather small,  $\frac{3}{5}$  width of head, extending to below anterior border of eye; teeth very small, in 2 or 3 series, about 80 in outer series of upper jaw; 3 series of scales on the cheek, width of scaly part about  $\frac{1}{2}$  diameter of eye. Gill-rakers short, 8 on lower part of anterior arch. Dorsal XV 12; spines increasing in length to the last, which measures about  $\frac{1}{2}$  length of head; soft rays

Fig. 177.



*Tilapia brevis.*

Type.

scarcely if at all longer. Anal III 9; third spine a little shorter than longest dorsal. Pectoral as long as head, reaching vertical of origin of anal. Ventral reaching origin of anal. Caudal deeply emarginate. Caudal peduncle as long as deep. Scales finely denticulate,  $31-32\frac{3}{12}$ ; lateral lines  $\frac{22-25}{16-17}$ . Silvery, back brownish; a dark brown opercular spot; a dark brown band on each side, from the nape to the root of the tail.

Total length 70 millim.

Lake Nyassa.

1-2. Types.

L. Nyassa.

Capt. E. L. Rhoades (P.).

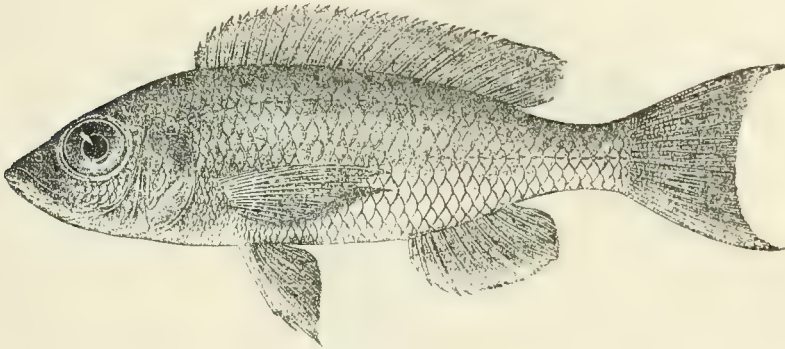


## 91. TILAPIA INORNATA.

Bouleng. Ann. & Mag. N. H. (8) ii. 1908, p. 242.

Depth of body equal to length of head,  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times in total length. Head a little over twice as long as broad; snout rounded, with straight or slightly convex upper profile, as long as broad, as long as postocular part of head; eye  $2\frac{3}{4}$  to 3 times in length of head, exceeding interorbital width, nearly twice as long as least præorbital depth; mouth small,  $\frac{1}{2}$  to  $\frac{3}{5}$  width of head, extending to between nostril and eye; teeth very small, in 3 series, about 50 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part not half diameter of eye. Gill-rakers moderately long, 15 or 16 on lower part of anterior

Fig. 178.

*Tilapia inornata.*

Type.

arch. Dorsal XVI–XVII 11–12; spines increasing in length to the last, which measures a little less than  $\frac{1}{2}$  length of head; longest soft rays not longer. Anal III 9; third spine a little more than  $\frac{1}{3}$  length of head. Pectoral as long as head, not reaching origin of anal. Ventral barely reaching vent. Caudal with crescentic emargination. Caudal peduncle  $1\frac{2}{3}$  times as long as deep. Scales finely denticulate, 34–36  $\frac{3\frac{1}{2}-4}{11-12}$ ; lateral lines  $\frac{25-28}{16-18}$ . Silvery, back olive; a dark opercular spot.

Total length 95 millim.

Lake Nyassa.

1–2. Types.

L. Nyassa.

Capt. E. L. Rhoades (P.).

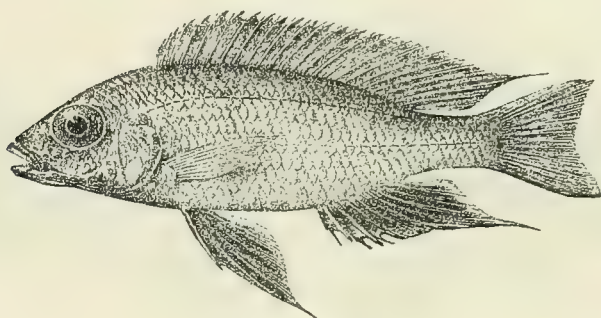


## 92. TILAPIA TREMATOCEPHALA.

Bouleng. Ann. & Mag. N. H. (7) vii. 1901, p. 4, Poiss. Bass. Congo, p. 475 (1901),  
and Tr. Zool. Soc. xvi. 1901, p. 157, pl. xix. fig. 6 ; Pellegr. Mém. Soc. Zool.  
France, xvi. 1904, p. 334.

Depth of body equal to length of head,  $3\frac{1}{4}$  times in total length. Head a little over twice as long as broad ; snout rounded, with slightly convex upper profile, as long as broad, as long as postocular part of head ; eye 3 times in length of head, exceeding interorbital width, nearly twice as long as least præorbital depth ; mouth small,  $\frac{1}{2}$  width of head, extending to between nostril and eye ; teeth very small, in 2 series, about 50 in outer series of upper jaw ; 3 series of scales on the cheek ;

Fig. 179.

*Tilapia trematocephala.*

Type (Tr. Z. S. 1901).

orifices of sensory canals on head remarkably large. Gill-rakers rather short, 13 on lower part of anterior arch. Dorsal XVI 11 ; last spine longest,  $\frac{1}{2}$  length of head ; longest soft rays produced into filaments, as long as head. Anal III 9 ; third spine nearly as long as and stronger than last dorsal. Pectoral  $\frac{3}{4}$  length of head, not reaching vertical of origin of anal. Ventral extending beyond origin of anal. Caudal deeply emarginate. Caudal peduncle  $1\frac{1}{2}$  times as long as deep. Scales very indistinctly denticulate,  $40\frac{3}{10}$  ; lateral lines  $\frac{28}{7}$ . Brownish ; dorsal and caudal greyish ; ventrals and anal black, latter edged with white.

Total length 90 millim.

Lake Tanganyika.

1. Type.

North end of L. Tanganyika.

Prof. J. E. S. Moore (C.).

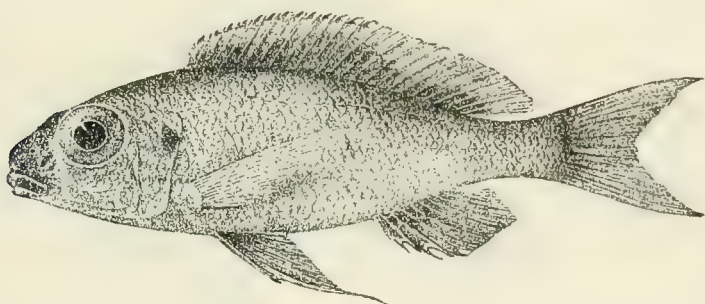
93. TILAPIA BOOPS. *Ophthalmitilapia boops* Bouleng.

Bouleng. Ann. & Mag. N. H. (7) vii. 1901, p. 5, Poiss. Bass. Congo, p. 476 (1901), and Tr. Zool. Soc. xvi. 1901, p. 158, pl. xix. fig. 5.

*Ophthalmitilapia boops*, Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 345.

Depth of body equal to length of head,  $3\frac{1}{4}$  to  $3\frac{1}{3}$  times in total length. Head twice as long as broad; snout short and rounded, with strongly convex upper profile, broader than long, as long as postocular part of head; eye  $2\frac{1}{2}$  times in length of head, a little exceeding inter-orbital width, more than twice as long as least præorbital depth; mouth small, subinferior,  $\frac{2}{3}$  width of head, not extending quite to below anterior border of eye; teeth very small, tricuspid, in 3 series, about 70 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly

Fig. 180.

*Tilapia boops*.

Type (Tr. Z. S. 1901).

part not half diameter of eye. Gill-rakers short, 13 on lower part of anterior arch. Dorsal XII–XIII 14; spines feeble, equal in length from the seventh, which measures nearly  $\frac{1}{3}$  length of head; soft rays scarcely longer. Anal III 8–9; third spine as long as and stronger than dorsals. Pectoral as long as head, reaching origin of anal. Ventral produced into a filament, extending beyond origin of anal. Caudal with deep crescentic notch. Caudal peduncle nearly twice as long as deep. Scales feebly denticulate, 39–40  $\frac{5}{14-15}$ ; lateral lines  $\frac{34-36}{15-19}$ . Brown above, white beneath; a blackish opercular spot.

Total length 90 millim.

Lake Tanganyika.

1–2. Types.

Msambu.

Prof. J. E. S. Moore (C.).

94. *TILAPIA GRANDOCULIS*.

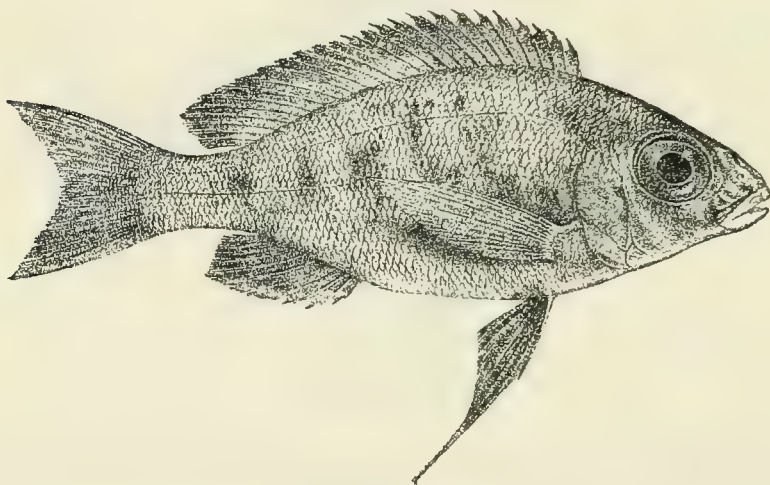
Bouleng. Tr. Zool. Soc. xv. 1899, p. 94, pl. xix. fig. 6, Ann. Mus. Congo, Zool. i. p. 150, pl. liv. fig. 6 (1900), Poiss. Bass. Congo, p. 477 (1901), and Tr. Zool. Soc. xvii. 1906, p. 573.

*Ectodus foæ*, Vaill. Bull. Mus. Paris, 1899, p. 221, and Rés. Scient. Voy. E. Foa, p. 561 (1908).

*Ophthalmotilapia foæ*, Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 345.

Depth of body 3 to  $3\frac{3}{4}$  times in total length, length of head 3 to  $3\frac{1}{2}$  times. Head not quite twice as long as broad; snout short and rounded, with convex upper profile, broader than long, as long as postocular part of head; eye  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times in length of head, a little exceeding interorbital width, more than twice as long as least præorbital

Fig. 181.

*Tilapia grandoculis*.

Type (Tr. Z. S. 1899).

depth; mouth small,  $\frac{1}{2}$  to  $\frac{3}{5}$  width of head, extending to between nostril and eye; teeth very small, in 3 to 5 series, outer obtusely pointed or bi- or tricuspid, 60 to 70 in upper jaw; 2 to 4 series of very small scales on the cheek, width of scaly part not half diameter of eye. Gill-rakers short, 14 to 17 on lower part of anterior arch. Dorsal XIII-XIV 13-14; spines feeble, equal in length from the seventh, which measures about  $\frac{2}{5}$  length of head; longest soft rays about  $\frac{1}{2}$  length of head. Anal III 9-10; third spine stronger but shorter than dorsals. Pectoral as long as or a little longer than head, reaching origin of anal.

Ventral more or less produced, reaching origin of anal or beyond. Caudal with deep crescentic notch. Caudal peduncle a little longer than deep. Scales finely denticulate, 55–65  $\frac{5-6}{18-25}$ ; lateral lines  $\frac{48-60}{22-36}$ . Dark olive-brown above, shading to lighter, with some yellow, below; a series of about five irregular blackish blotches on the side of the body; dorsal with yellow spots, sometimes tipped with black.

Total length 115 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

1. Ad.	Sumbu.	Dr. W. A. Cunningham (C.).
2–3. Ad.	Niamkolo.	„
4. Skel.	„	„
5. Ad.	Moliro.	Dr. L. Stappers (C.).

## 2. PETROCHROMIS.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 20, and Poiss. Bass. Congo, p. 479 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 350; Bouleng. Fish. Nile, p. 535 (1907).

Barely separable from *Tilapia*, differing only in the broader bands of teeth in the jaws, showing when the mouth is closed, the teeth being all very slender with expanded tricuspid crowns bent inwards and disposed very irregularly \*. Vertebrae 31–32 †.

Great Lakes of Africa.

### *Synopsis of the Species.*

I. 3 series of scales on the cheek; 20–28 gill-rakers on lower part of anterior arch.

D. XVI–XVII 11–13; A. III 9–10; Sc. 32–

33  $\frac{4}{17-20}$ ; dorsal spines equal from the sixth

or eighth . . . . . 1. *P. tanganicæ*, Gthr., p. 268.

D. XVI–XVII 13; A. III 9–10; Sc. 32–34  $\frac{4}{16}$ ;

dorsal spines increasing in length to the

last . . . . . 2. *P. andersonii*, Blgr., p. 269.

\* As in *Tilapia*, the teeth are much more numerous and form broader bands in the adult than in the young. Thus, in *P. tanganicæ* the transverse series vary with age from 5 to 12, the outer series containing 58–100 teeth.

† 31 (17+14) in *P. tanganicæ*, 32 (17+15) in *P. polyodon*.



II. 4-6 series of scales on the cheek; 10-16 gill-rakers on lower part of anterior arch.

D. XVII-XIX 8-10; A. III 7-8; Sc. 32-

34  $\frac{3-4}{12-13}$ ; 10-13 gill-rakers; snout  $1\frac{1}{2}$ -2

times as long as eye . . . . . 3. *P. polyodon*, Blgr., p. 270.

D. XIX 8; A. III 7; Sc. 35  $\frac{4-5}{17}$ ; 13 gill-rakers;

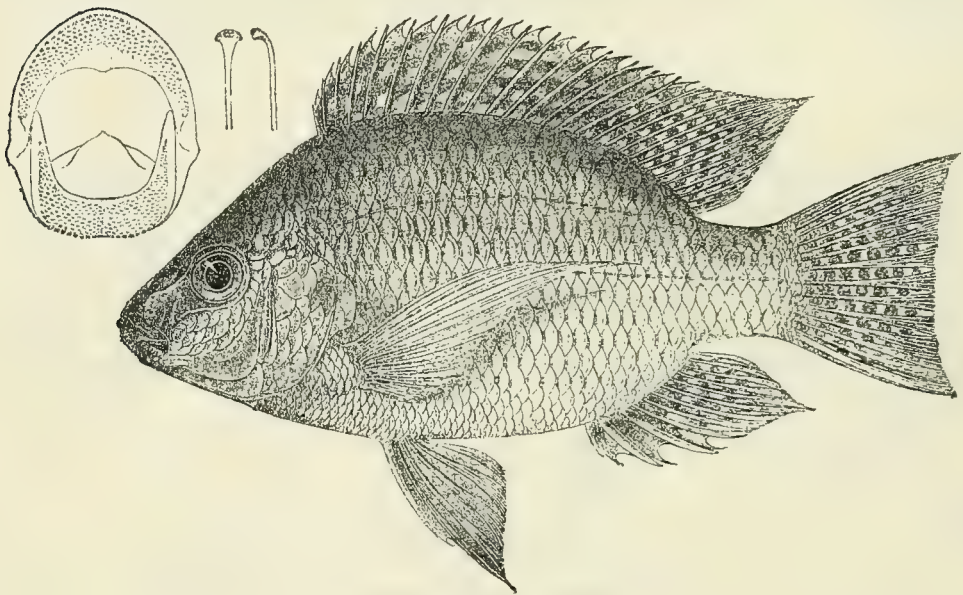
snout  $1\frac{1}{2}$  times as long as eye . . . . . 4. *P. nyassæ*, Blgr., p. 272.

D. XVIII-XX 8-9; A. III 7-8; Sc. 32-

34  $\frac{3\frac{1}{2}-4}{14-15}$ ; 12-16 gill-rakers; snout not or

but slightly longer than eye . . . . . 5. *P. fasciolatus*, Blgr., p. 273.

Fig. 182.



*Petrochromis tanganicæ*.

Niamkolo.  $\frac{1}{2}$ .

### 1. PETROCHROMIS TANGANICÆ.

*Chromis tanganicæ*, Günth. Proc. Zool. Soc. 1893, p. 630, fig.

*Tilapia tanganicæ*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 5, and Proc. Zool. Soc. 1899, p. 113.

*Petrochromis tanganicæ*, Bouleng. Poiss. Bass. Congo, p. 480 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 351.

Depth of body 2 to  $2\frac{2}{3}$  times in total length, length of head  $2\frac{4}{5}$  to 3 times. Head twice or a little less than twice as long as broad; snout  $1\frac{1}{4}$  to  $1\frac{1}{2}$  times as long as eye, which is  $3\frac{1}{2}$  to  $4\frac{1}{2}$  times in length of head and  $1\frac{2}{5}$  to 2 times in interorbital width; mouth extending to below nostril or a little beyond; 3 series of scales on the cheek, depth

of scaly part not greater than diameter of eye. Gill-rakers short, 20 to 28 on lower part of anterior arch. Dorsal XVI-XVII 11-13; spines strong, subequal from the sixth or eighth,  $\frac{2}{3}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Anal III 9-10; third spine a little shorter than longest dorsal. Pectoral longer than head, extending a little beyond origin of anal. Ventral reaching vent or origin of anal. Caudal truncate, slightly emarginate. Caudal peduncle as long as deep or a little deeper than long. Scales not denticulate, 32-33  $\frac{4}{17-20}$ ; lateral lines  $\frac{14-21}{8-16}$ . Olive above, silvery beneath; a more or less distinct dark opercular spot; vertical fins with dark and light spots, or dorsal with dark oblique streaks.

Total length 300 millim.

Lake Taganyika.

1-2. Types.	Ujiji.	E. Coode Hore, Esq. (C.).
3. Ad.	Kilambo.	Prof. J. E. S. Moore (C.).
4. Ad.	Niamkolo.	Dr. W. A. Cunningham (C.).
5. Ad.	Kitutu.	"
6. Skel.	Albertville.	Capt. Heeq (C.).
7-9. Yg.	Mouth of Lobozi R.	Dr. L. Stappers (C.).

The very young, about 30 millim. long, are very difficult to distinguish from the young of *Tilapia nilotica*. They have likewise an ocellar black spot on the anterior part of the soft dorsal.

## 2. PETROCHROMIS ANDERSONII.

Bouleng. Ann. & Mag. N. H. (7) viii. 1901, p. 13; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 351; Bouleng. Fish. Nile, p. 535, pl. xevi. (1907).

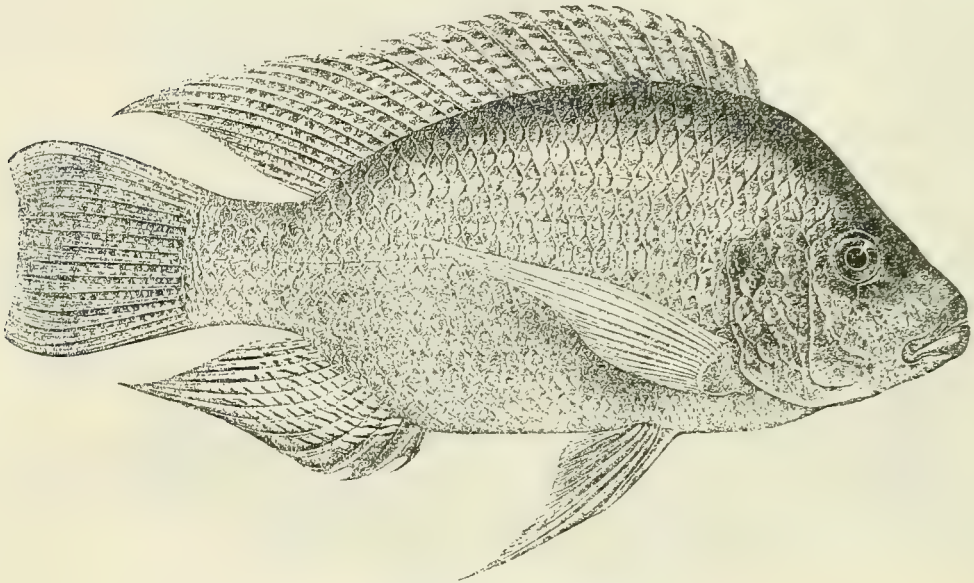
Depth of body 2 to  $2\frac{1}{5}$  times in total length, length of head 3 times. Head not quite twice as long as broad; snout  $1\frac{2}{3}$  times as long as eye, which is  $4\frac{2}{3}$  to 5 times in length of head and 2 to  $2\frac{1}{4}$  times in inter-orbital width; mouth with thick lips, extending to between nostril and eye; 3 series of scales on the cheek, depth of scaly part equal to or greater than diameter of eye. Gill-rakers short, 25 on lower part of anterior arch. Dorsal XVI-XVII 13; spines very strong, increasing in length to the last, which measures about  $\frac{1}{2}$  length of head; longest soft rays a little longer or a little shorter than head. Anal III 9-10; third spine shorter than last dorsal. Pectoral much longer than head, reaching beyond origin of anal. Ventral reaching anal. Caudal truncate. Caudal peduncle slightly deeper than long. Scales not denticulate, 32-34  $\frac{4}{16}$ ; lateral lines  $\frac{21-22}{11-13}$ . Olive above, the scales

darker at the base; a black opercular spot; spinous dorsal and anal with numerous dark horizontal streaks; soft dorsal and caudal with round light spots on a dark ground; soft dorsal edged with bright yellow.

Total length 420 millim.

Lakes Albert and Tanganyika.

Fig. 183.



*Petrochromis andersonii*.

Type (F. N.).  $\frac{2}{7}$ .

Doubtfully distinct from the preceding.—The occurrence in L. Albert needs confirmation.

- |          |                            |                            |
|----------|----------------------------|----------------------------|
| 1. Type. | L. Albert.                 | Prof. J. E. S. Moore (C.). |
| 2. Ad.   | Kilewa Bay, L. Tanganyika. | Dr. L. Stappers (C.).      |

### 3. PETROCHROMIS POLYODON.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 20, pl. vi. fig. 1, and Poiss. Bass. Congo, p. 479 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 352; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 573.

Depth of body  $2\frac{1}{2}$  to 3 times in total length, length of head  $2\frac{3}{4}$  to 3 times. Head twice or a little less than twice as long as broad; snout broader than long,  $1\frac{1}{2}$  to 2 times as long as eye, which is 4 to 5 times in length of head and  $1\frac{1}{2}$  to 2 times in interorbital width; mouth



extending to between nostril and eye, upper lip very thick; 4 to 6 series of scales on the cheek. Gill-rakers very short, 10 to 13 on lower part of anterior arch. Dorsal XVII-XIX 8-10; spines increasing in length to the sixth or eighth, which measures about  $\frac{2}{5}$  length of head; longest soft rays  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head. Anal III 7-8; third spine as long as and stronger than longest dorsal. Pectoral as long as or a little shorter than head, reaching origin of anal or not quite so far. Ventral

Fig. 184.



*Petrochromis polyodon.*  
Type (Tr. Z. S. 1898).  $\frac{2}{3}$ .

reaching vent or anal. Caudal truncate. Caudal peduncle as long as deep. Scales feebly denticulate, 32-34  $\frac{3-4}{12-13}$ ; lateral lines  $\frac{22-24}{13-17}$ . Olive-brown above, lighter beneath, fins grey or blackish; anal sometimes with several bright yellow spots.

Total length 200 millim.

Lake Tanganyika.

1. Type.	Kinyamkolo.	Prof. J. E. S. Moore (C.).
2. Type.	Mbity Rocks.	"
3-4. Ad.	Niamkolo.	Dr. W. A. Cunningham (C.).
5. Hgr.	Pembe.	"
6. Ad.	Moliro.	Dr. L. Stappers (C.).
7. Ad.	Tumpa.	"
8. Skel.	L. Tanganyika.	Prof. J. E. S. Moore (C.).

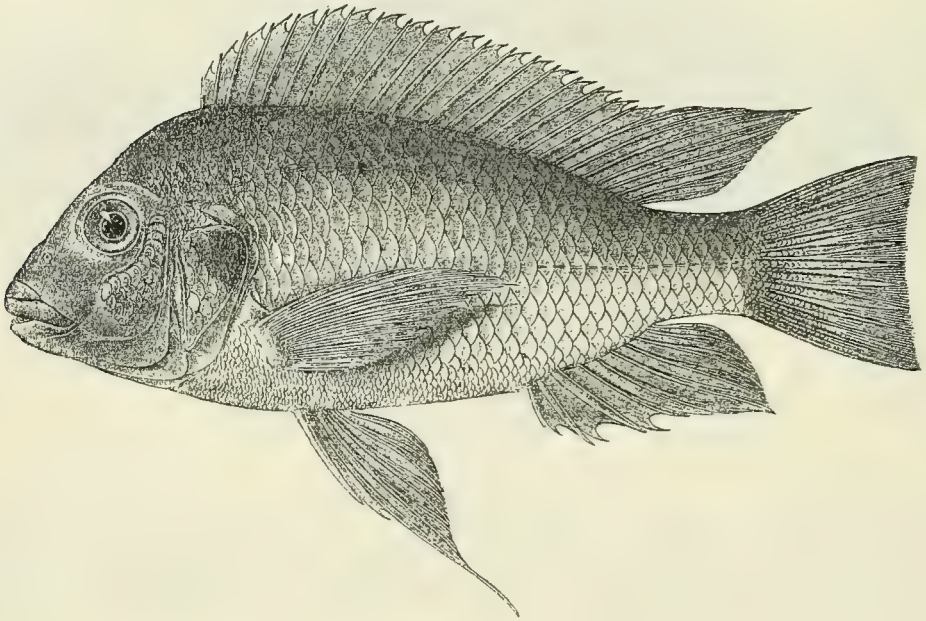


## 4. PETROCHROMIS NYASSÆ.

Bouleng. Ann. & Mag. N. H. (7) x. 1902, p. 70; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 352.

Depth of body  $2\frac{1}{2}$  times in total length, length of head 3 times. Head  $1\frac{2}{3}$  times as long as broad; snout much broader than long,  $1\frac{1}{2}$  times as long as eye, which is 4 times in length of head and  $1\frac{2}{3}$  times in interorbital width; mouth extending to between nostril and eye, upper lip very thick; 4 series of scales on the cheek. Gill-rakers very short, 13 on lower part of anterior arch. Dorsal XIX 8; spines increasing in length to the seventh, which measures about  $\frac{1}{2}$  length

Fig. 185.

*Petrochromis nyassæ.*

Type.

of head; longest soft rays as long as head. Anal III 7; third spine thicker but a little shorter than longest dorsal. Pectoral a little longer than head, nearly reaching origin of anal. Ventral produced, extending beyond origin of anal. Caudal truncate, slightly emarginate. Caudal peduncle as long as deep. Scales feebly denticulate, very minute on breast and belly,  $35\frac{4-5}{17}$ ; lateral lines  $\frac{23}{14}$ . Olive-brown; a black opercular spot.

Total length 185 millim.

Lake Nyassa.

1. Type.

L. Nyassa.

Prof. J. E. S. Moore (C.).

## 5. PETROCHROMIS FASCIOLATUS.

Bouleng. Rev. Zool. Afr. iii. 1914, p. 446.

Depth of body  $2\frac{3}{4}$  to  $3\frac{1}{4}$  times in total length, length of head 3 to  $3\frac{1}{4}$  times. Head  $1\frac{2}{3}$  to  $1\frac{3}{4}$  times as long as broad; snout much broader than long, not or but little longer than eye, which is  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times in length of head and  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times in interorbital width; mouth extending to below nostril, or to between nostril and eye; lips thick; 3 or 4 series of scales on the cheek. 12–16 gill-rakers on lower part of anterior arch. Dorsal XVIII–XX 8–9; spines subequal from the seventh or eighth, about  $\frac{2}{5}$  length of head; longest soft rays about  $\frac{1}{2}$  length of head. Anal III 7–8; third spine as long as longest dorsals. Pectoral as long as head, not quite reaching vertical of origin of anal. Ventral reaching vent or origin of anal. Caudal truncate. Caudal peduncle a little longer than deep. Scales feebly denticulate, 32–34  $\frac{3\frac{1}{2}-4}{14-15}$ ; lateral lines  $\frac{23-24}{10-17}$ . Dark brown, with numerous, more or less distinct vertical blackish bars; a black opercular spot; fins greyish brown.

Total length 115 millim.

Lake Tanganyika.—Types in Congo Museum, Tervueren.

1–2. Two of the types.

Kapampa.

Dr. L. Stappers (C.).

## 3. CUNNINGTONIA.

Bouleng. Tr. Zool. Soc. xvii. 1906, p. 573.

Body moderately elongate; scales ctenoid; two lateral lines, upper nearly complete, lower incomplete. Jaws with broad bands of minute, bristle-like teeth with incurved tricuspid crowns. Maxillary largely exposed at the end. Dorsal with 13 spines, anal with 3. Vertebrae 36 (18+18).

Lake Tanganyika.

Connected with *Tilapia* through *T. grandoculis*.

## 1. CUNNINGTONIA LONGIVENTRALIS.

Bouleng. t. c. p. 574, pl. xli. fig. 2.

Depth of body equal to length of head, 3 times in total length. Head twice as long as broad; snout much broader than long, very convex, shorter than eye, which is  $2\frac{1}{2}$  times in length of head and equals interorbital width; mouth extending to below anterior border of eye;

teeth in 5 or 6 series; 2 or 3 series of scales on the cheek. Gill-rakers rather short, 13–15 on lower part of anterior arch. Dorsal XIII 13–14; spines weak, subequal from the seventh, nearly  $\frac{1}{2}$  length of head; posterior soft rays produced,  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head. Anal III 8–9; spines weak, third  $\frac{1}{3}$  length of head; soft rays produced like the dorsals. Pectoral as long as head, extending beyond vertical of origin of anal. Ventral produced into a very long filament, nearly twice as long as head. Caudal with deep crescentic notch. Caudal peduncle  $1\frac{1}{2}$  times as long as deep. Scales finely denticulate, 38–43  $\frac{4}{14-15}$ ; lateral lines  $\frac{33-36}{15-18}$ . Bluish black above, bright silvery beneath; fins blackish.

Total length 110 millim.

Lake Tanganyika.

1–2. Types.

Niamkolo.

Dr. W. A. Cunningham (C.).

Fig. 186.



*Cunninghamia longiventralis*.

Type (Tr. Z. S. 1906).  $\frac{5}{8}$ .

#### 4. SIMOCHROMIS.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 19, and Poiss. Bass. Congo, p. 451 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 306.

Body moderately elongate; scales denticulate; two incomplete lateral lines. Jaws with broad bands of very small tricuspid teeth and an outer row of bicuspid teeth; these outer teeth differentiated on the sides of the præmaxillaries, enlarged and conical; mouth nearly straight



and transverse when closed ; maxillary concealed under the præorbital. Dorsal with 17-19 spines, anal with 3. Vertebrae 32 (15+17).

Intermediate between *Tilapia* and *Tropheus*. As pointed out by Pellegrin, this genus is connected with *Tilapia* through *T. williamsii*.

#### 1. SIMOCHROMIS DIAGRAMMA.

*Chromis diagramma*, Günth. Proc. Zool. Soc. 1893, p. 632, pl. lviii. fig. 3.

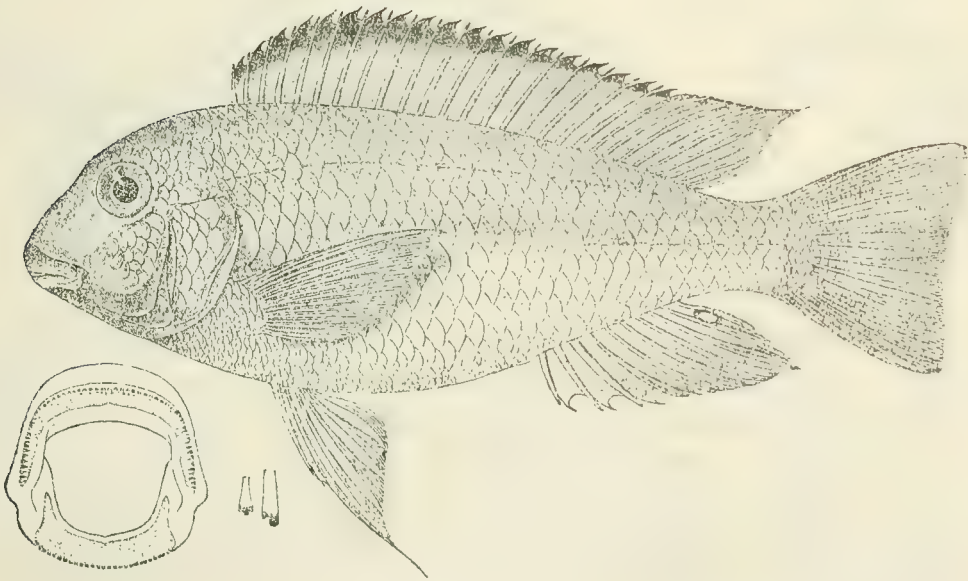
*Simochromis diagramma*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 19, and Poiss. Bass.

Congo, p. 451 (1901) ; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 307 ;

Bouleng. Tr. Zool. Soc. xvii. 1906, p. 571.

Depth of body  $2\frac{1}{2}$  to 3 times in total length, length of head  $3\frac{1}{4}$  to  $3\frac{1}{2}$

Fig. 187.



*Simochromis diagramma*.

Pembe.  $\frac{2}{3}$ .

times. Head massive, rounded, not twice as long as broad ; snout broader than long, with convex upper profile ; eye 3 to  $3\frac{1}{2}$  times in length of head, about  $1\frac{1}{2}$  times in interorbital width ; mouth with thick upper lip, extending to below anterior border of eye or not quite so far ; 8 to 10 series of teeth in each jaw ; 4 series of scales on the cheek. Gill-rakers short, 12 or 13 on lower part of anterior arch. Dorsal XVII-XIX 9-10 ; spines increasing in length to the sixth or seventh, which measures  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head ; longest soft rays about  $\frac{2}{3}$  length of head. Anal III 7-9 ; third spine as long as and stronger than



longest dorsal. Pectoral as long as head. Ventral reaching vent or origin of anal. Caudal truncate. Caudal peduncle as long as deep. Scales feebly denticulate,  $31-36 \frac{3-4}{10-11}$ ; lateral lines  $\frac{20-24}{10-16}$ . Olive above; whitish beneath, young with 9 or 10 more or less distinct darker bars on the body; gill-membranes sometimes black, or with black spots; fins greyish, dorsal with a black border, sometimes with a dark brown band in addition; anal sometimes with a bright ocellar spot.

Total length 195 millim.

Lake Tanganyika.

1-4. Types.	Ujiji.	E. Coode Hore, Esq. (C.).
5. Ad.	Msambu.	Prof. J. E. S. Moore (C.).
6. Hgr.	Sumbu.	Dr. W. A. Cunningham (C.).
7. Ad.	Vua.	"
8. Ad.	Pembe.	"
9-11. Ad. & yg.	Kinyamkolo.	Prof. J. E. S. Moore (C.).
12-17. Ad. & hgr.	Niamkolo.	Dr. W. A. Cunningham (C.).
18. Skel.	"	"

### 5. TROPHEUS.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 17, and Poiss. Bass. Congo, p. 449 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 305.

Body moderately elongate; scales denticulate; two incomplete lateral lines. Jaws angularly bent at the sides, with bands of very small tricuspid teeth, and an outer row of bicuspid teeth; sides of the præmaxillaries with a series of abruptly differentiated conical teeth; mouth nearly straight and transverse when closed; maxillary concealed under the præorbital. Dorsal with 20 or 21 spines, anal with 4 to 6. Occipital and parietal crests strong, extending to between the orbits. Vertebrae 33 (17+16).

Lake Tanganyika.

Two species:—

D. XX-XXI 5-6; A. V-VI 5-6; Sc. 30-32  $\frac{3}{12}$ . 1. *T. moorii*, Blgr., p. 276.

D. XX 5-6; A. IV 6-7; Sc. 28-30  $\frac{3}{11}$ . . . . 2. *T. annectens*, Blgr., p. 278.

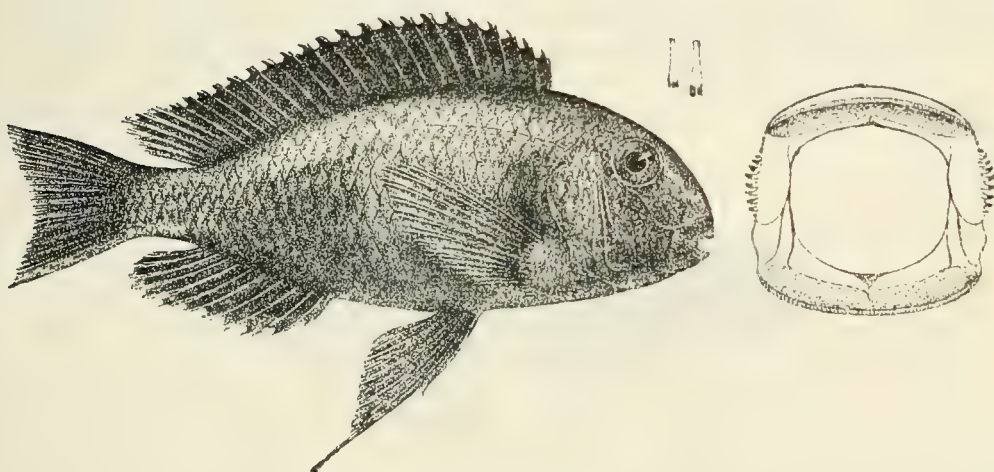
#### 1. TROPHEUS MOORII.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 18, pl. v. fig. 2, and Poiss. Bass. Congo, p. 449 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 305, pl. vii. fig. 2.

Depth of body  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times in total length, length of head  $3\frac{1}{4}$  to

$3\frac{1}{2}$  times. Head massive, rounded, not twice as long as broad; snout broader than long, with convex upper profile; eye  $3\frac{1}{2}$  to 4 times in length of head,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times in interorbital width; mouth with thick upper lip, extending to below anterior border of eye; teeth in 8 to 10 transverse series; 4 series of scales on the cheek. Gill-rakers short, 11 or 12 on lower part of anterior arch. Dorsal XX–XXI 5–6; spines increasing in length to the sixth, which is not quite  $\frac{1}{2}$  length of head; longest soft rays  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Anal V–VI 5–6; last spine a little longer than longest dorsal. Pectoral as long as head.

Fig. 188.

*Trophus moorii*.Type (Tr. Z. S. 1898).  $\frac{5}{8}$ .

Ventral produced into a short filament, extending beyond origin of anal. Caudal feebly emarginate. Caudal peduncle as long as deep. Scales feebly denticulate, 30–32  $\frac{3}{12}$ ; lateral lines  $\frac{22-25}{11-12}$ . Dark brown, with a large bluish-white blotch on each side of the body, the belly reddish brown, or dark reddish brown with darker edges to the dorsal scales; fins blackish, or dull red, the dorsal tipped with black.

Total length 115 millim.

Lake Tanganyika.

1–3. Types.

Kinyamkolo.

Prof. J. E. S. Moore (C.).

4. Skel.

"

"

5. Ad.

Sumbu.

Dr. W. A. Cunningham (C.).

## 2. TROPHEUS ANNECTENS.

Bouleng. Ann. Mus. Congo, Zool. i. p. 148, pl. lii. fig. 2 (1900), and Poiss. Bass. Congo, p. 450 (1901) ; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 306.

Depth of body  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times in total length, length of head  $3\frac{1}{4}$  to  $3\frac{1}{3}$  times. Head massive, rounded, not twice as long as broad ; snout broader than long, with convex upper profile ; eye  $3\frac{1}{2}$  times in length of head,  $1\frac{1}{2}$  times in interorbital width ; mouth with thick upper lip, extending to below anterior border of eye ; 8 series of teeth in each jaw ; 5 series of scales on the cheek. Gill-rakers short, 12 on lower part of anterior arch. Dorsal XX 5-6 ; spines equal from the sixth or seventh, a little less than  $\frac{1}{2}$  length of head ; soft rays a little longer. Anal IV 6-7 ; last spine as long as and stronger than longest dorsal. Pectoral a little shorter than head. Ventral produced into

Fig. 189.

*Tropheus annectens.*

Type (A. M. C.).

a filament, extending a little beyond origin of anal. Caudal slightly emarginate. Caudal peduncle as long as deep. Scales feebly denticulate,  $28-30 \frac{3}{11}$  ; lateral lines  $\frac{21}{7}$ . Uniform brownish.

Total length 80 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

1. One of the types. Albertville. Capt. Hecq (C.).

This species may have to be united with the preceding.

## 6. ASPROTILAPIA.

Bouleng. Ann. & Mag. N. H. (7) vii. 1901, p. 5, Poiss. Bass. Congo, p. 482 (1901), and Tr. Zool. Soc. xvi. 1901, p. 159 ; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 353.

Body elongate, rather feebly compressed, much attenuate in the

caudal region; scales ctenoid; two incomplete lateral lines. Teeth small, with long slender shafts and expanded tricuspid crowns, in two series in both jaws. Mouth inferior, transverse; greater part of maxillary bone concealed under the præorbital. Dorsal with 14 spines, anal with 3. Parietal and occipital crests moderately strong, extending to between the orbits. Vertebrae 35 (16+19).

Lake Tanganyika.

Connected with *Tilapia* through *T. boops*.

### 1. ASPROTILAPIA LEPTURA.

Bouleng. Il. cc., Tr. pl. xx. fig. 2; Pellegr. t. c. p. 354.

Depth of body 5 times in total length, length of head  $3\frac{2}{3}$  to 4 times. Head twice as long as broad; snout as long as broad, subconical, strongly projecting beyond the mouth,  $\frac{1}{3}$  length of head; eye very

Fig. 190.



*Asprotilapia leptura*.

Type (Tr. Z. S. 1901).  $\frac{5}{8}$ .

large, as long as snout and nearly twice interorbital width,  $2\frac{3}{5}$  to  $2\frac{2}{3}$  times in length of head; width of mouth  $\frac{3}{5}$  that of head; 36 to 40 teeth in outer row of upper jaw; 3 series of small scales on the cheek. Gill-rakers very short, tubercle-like, 15 or 16 on lower part of anterior arch. Dorsal XIV 14; spines slender and subequal,  $\frac{2}{3}$  length of head; soft rays a little longer. Anal III 8; third spine nearly as long as dorsals. Pectoral a little shorter than head. Ventral reaching vent. Caudal deeply emarginate, crescentic. Caudal peduncle 3 times as long as deep. Scales strongly denticulate,  $38\frac{2}{11}$ ; lateral lines  $\frac{27}{20}$ . Brown, darker on the snout and vertex; a blackish opercular spot; fins greyish.

Total length 110 millim.

Lake Tanganyika.

1. Type.	Msambu.	Prof. J. E. S. Moore (C.).
2. Ad.	L. Tanganyika.	„
3. Skel.	„	„



## 7. LOBOCHILOTES, g. n.

Body moderately elongate; scales ctenoid; two incomplete lateral lines. Mouth narrow, with several series of compressed teeth which are feebly notched or tricuspid in the young and obtuse in the adult; the teeth of the outer series rather large. Maxillary exposed at the end. Dorsal with 17 to 19 spines, anal with 3. Occipital and parietal crests strong, extending to between the orbits. Vertebrae 32 (15+17).

Lake Tanganyika.

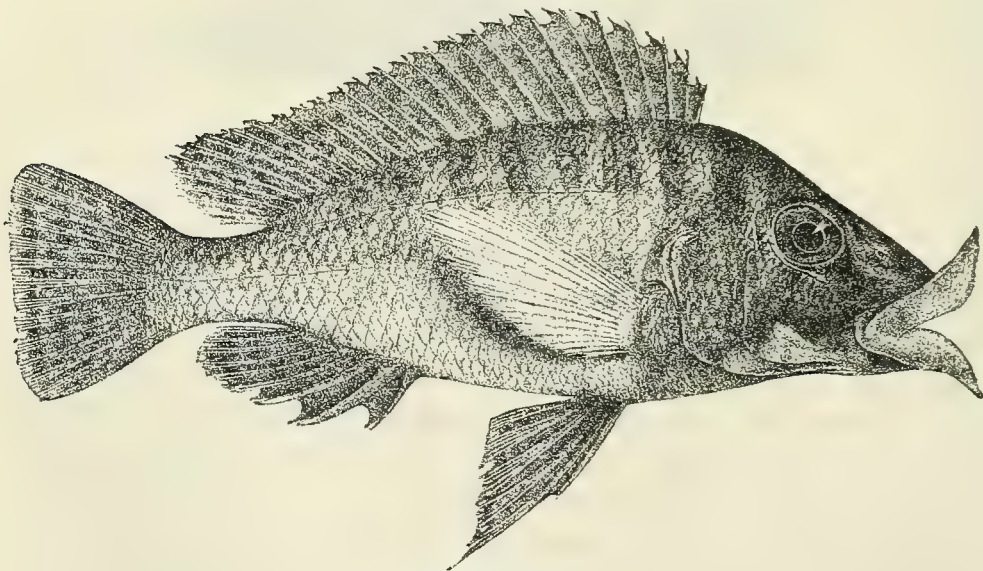
Intermediate between *Tilapia* and *Docimodus*.

## 1. LOBOCHILOTES LABIATUS.

*Tilapia labiata*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 17, pl. v. fig. 1, and Poiss. Bass. Congo, p. 473 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 343; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 572.

Depth of body  $2\frac{2}{3}$  to 3 times in total length, length of head  $2\frac{2}{3}$  to  $2\frac{4}{5}$  times. Head 2 (young) to  $2\frac{1}{2}$  times as long as broad, with straight

Fig. 191.



*Loboichilotes labiatus*.

Type (Tr. Z. S. 1898).  $\frac{4}{5}$ .

upper profile; snout obtusely pointed, longer than broad and longer than postocular part of head in the adult; eye  $3\frac{1}{2}$  (young) to  $5\frac{1}{2}$  times in length of head,  $1\frac{1}{4}$  to  $2\frac{1}{2}$  times in length of snout, 1 to  $1\frac{1}{2}$  times in interorbital width, less than præorbital depth in the adult; mouth

extending to below nostril or to between nostril and eye, with very strongly developed lips, both upper and lower produced into a large triangular lobe; teeth in 3 to 5 series, 34 to 66 in outer series of upper jaw; middle pharyngeal teeth, with spheroid crowns; 3 or 4 series of scales on the cheek, width of scaly part equal to or a little less than diameter of eye. Gill-rakers moderately long, 15 to 20 on lower part of anterior arch. Dorsal XVII–XIX 9–11; middle dorsal spines longest,  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; longest soft rays  $\frac{1}{2}$ , or nearly  $\frac{1}{2}$ , length of head. Anal III 6–8; third spine as long as and stronger than longest dorsals. Pectoral  $\frac{4}{5}$  to  $\frac{6}{7}$  length of head, extending to vertical of origin of anal. Ventral reaching vent or origin of anal. Caudal truncate. Caudal peduncle  $1\frac{1}{4}$  to  $1\frac{1}{3}$  times as long as deep. Scales feebly denticulate, 33–35  $\frac{5-6}{12-15}$ ; lateral lines  $\frac{22-26}{12-19}$ . Pale olive, with 9 or 10 more or less distinct darker cross-bars; dark bars between the eyes; fins greyish brown, dorsal sometimes with oblique dark and light streaks, or with round reddish-yellow dark-edged ocellar spots between the soft rays; anal with or without yellow dark-edged ocellar spots; a yellow spot sometimes present on the middle of the ventral; caudal with numerous round dark spots between the rays.

Total length 330 millim.

Lake Tanganyika.

1–3. Types.	Kinyamkolo.	Prof. J. E. S. Moore (C.).
4. Skel.	”	”
5–6. Ad. & yg.	Niamkolo.	Dr. W. A. Cunningham (C.).
7. Ad.	Kibwesi.	Prof. J. E. S. Moore (C.).
8. Ad.	Kapampa.	Dr. L. Stappers (C.).

## 8. DOCIMODUS.

Bouleng. Proc. Zool. Soc. 1896, p. 917, and 1899, p. 141; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 348.

Body moderately elongate; scales cycloid; two incomplete lateral lines. Jaws with a very broad band of teeth with compressed sharp-edged crowns; the outer teeth large, with nail-shaped entire crowns or with a very small lateral cusp, the others small and tricuspid; maxillary exposed. Dorsal with 16 or 17 spines, anal with 3. Vertebrae 32 (14+18).

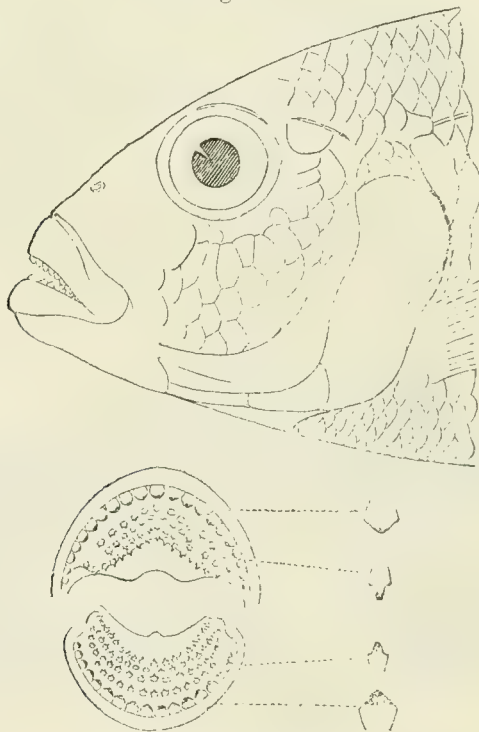
Lake Nyassa (Upper Shiré River).

1. *DOCIMODUS JOHNSTONII*.

Bouleng. ll. cc., fig. ; Pellegr. l. c.

Depth of body  $2\frac{3}{4}$  to 3 times in total length, length of head 3 times. Head twice as long as broad, with curved upper profile ; snout as broad as long, a little shorter than postocular part of head ; eye  $4\frac{1}{2}$  times in length of head,  $1\frac{1}{2}$  times in interorbital width ; mouth extending to between nostril and eye ; 3 or 4 series of scales on the cheek, depth of scaly part greater than diameter of eye. Gill-rakers short, 11 or 12 on lower part of anterior arch. Dorsal XVI-XVII 8-9 ; spines in-

Fig. 192.

*Docimodus johnstonii*.

Type (P. Z. S. 1896).

creasing in length to the fifth, which is  $\frac{2}{5}$  length of head. Anal III 9-10 ; third spine as long as and much thicker than last or penultimate dorsal. Caudal peduncle nearly  $1\frac{1}{2}$  times as long as deep. Scales  $33-34\frac{3}{10}$  ; lateral lines  $\frac{24}{15}$ . A black stripe along the posterior half of the body, between the lateral lines ; soft dorsal with round dark spots.

Total length 200 millim.

Upper Shiré River.

1-2. Types.

Upper Shiré.

Dr. Percy Rendall (C.) ;

Sir H. H. Johnston (P.).

## 9. STEATOCRANUS.

Bouleng. Ann. Mus. Congo, Zool. i. p. 52 (1899), Proc. Zool. Soc. 1899, p. 141, and Poiss. Bass. Congo, p. 481 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 350.

Body moderately elongate; scales cycloid; two incomplete lateral lines. Two widely separated series of notched teeth in both jaws, the outer larger, with one or two pairs of larger, truncate, incisor-like teeth at the symphysis; maxillary exposed. An adipose crest or swelling along the vertex and occiput. Dorsal with 19 or 20 spines, anal with 3. Vertebrae 30 (16+14).

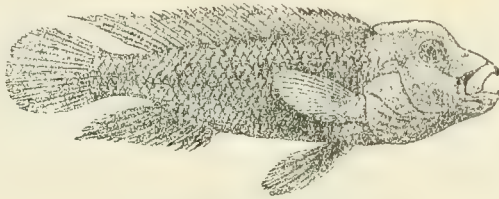
Congo.

## 1. STEATOCRANUS GIBBICEPS.

Bouleng. ll. cc., Ann. pl. xxviii. fig. 1; Pellegr. l. c.

Depth of body  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times in total length, length of head 3 times.

Fig. 193.



*Steatocranus gibbiceps*.

Type (A. M. C.).  $\frac{5}{6}$ .

Head twice as long as broad; snout as long as broad, with slightly convex upper profile, nearly twice as long as eye, which is  $4\frac{1}{2}$  to 5 times in length of head and equals interorbital width; mouth extending to below nostril; cheek naked. Gill-rakers very short, 7 on lower part of anterior arch. Dorsal XIX-XX 8; last spine longest,  $\frac{2}{5}$  length of head; soft rays more or less produced, the longest sometimes exceeding length of head. Anal III 6. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Ventral not reaching vent. Caudal rounded. Caudal peduncle as long as deep. Scales 32-35  $\frac{3}{14}$ ; lateral lines  $\frac{21}{10-11}$ . Brown, darker above, the scales with darker edges.

Total length 80 millim.

Congo.—Types in Congo Museum, Tervueren.

1. Type.	Matadi.	Capt. Wilverth (C.).
2. Ad.	Stanley Pool.	M. De Meuse (C.).



## 10. HAPLOCHROMIS.

*Haplochromis*, Pfeff. Sitzb. Ges. naturf. Fr. Berlin, 1888, p. 76; Bouleng. Fishes Nile, p. 495 (1907).

*Ctenochromis*, part., Pfeff. Jahrb. Hamb. Wiss. Anst. x. 1893, p. 149, and Thierw. O.-Afr., Fische, p. 14 (1896).

*Paratilapia*, part., Bouleng. Proc. Zool. Soc. 1898, p. 137, and Poiss. Bass. Congo, p. 412 (1901).

*Tilapia*, part., Bouleng. Proc. Zool. Soc. 1899, p. 105, and Poiss. Bass. Congo, p. 452.

*Astatotilapia*, Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 299.

*Astatoreochromis*, Pellegr. t. c. p. 384.

Body short or moderately elongate; scales ctenoid; two incomplete lateral lines. Teeth in 2 or more series, the outer conical or bicuspid, the inner usually tricuspid; maxillary bone exposed at the end when the mouth is closed. Dorsal fin with 13 to 19 spines, anal with 3 to 6. Vertebrae 28-32\*.

Africa and Syria.

Under this genus are grouped a number of allied species which vary to such an extent in their dentition that some specimens might be referred to *Tilapia* and others to *Paratilapia*.

*Synopsis of the Species.*

I. Caudal fin truncate or slightly emarginate.

A. Teeth in 4 to 7 series; caudal peduncle not or but slightly longer than deep; pectoral fin as long as head or a little shorter.

1. Mouth not extending to below anterior border of eye; 11 or 12 gill-rakers on lower part of anterior arch.

D. XVI 10-11; A. III 9-10; Sc. 33-36  $\frac{4-5}{12-13}$ ;

lower jaw slightly projecting; depth of body

$2\frac{3}{4}$  to 3 times in total length . . . . . 1. *H. livingstonii*, Gthr., p. 286.

\* Vertebrae:—

13+15=28. *H. moffati*.

13+17=30. *H. angustifrons*.

14+15=29. *H. desfontainesii*, *H. alluaudi*.

14+16=30. *H. desfontainesii*, *H. alluaudi*, *H. moeruensis*.

14+17=31. *H. ishmaeli*.

15+16=31. *H. desfontainesii*, *H. ishmaeli*, *H. nuchisquamulatus*,  
*H. venustus*.

15+17=32. *H. ishmaeli*.

- D. XVI 10-11; A. III 10; Sc. 32-35  $\frac{4-5}{14-16}$ ; jaws equal in front; depth of body  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times in total length . . . . . 2. *H. venustus*, Blgr., p. 287.
2. Mouth extending to below anterior border of eye, or not quite so far or a little farther; 8 to 10 gill-rakers.
- D. XV-XVI 9; A. III 8-9; Sc. 30-32  $\frac{3\frac{1}{2}-4}{12-13}$ ; eye shorter than snout, 4 to  $4\frac{1}{2}$  times in length of head . . . . . 3. *H. schubotzi*, Blgr., p. 288.
- D. XV-XVI 9-10; A. III 8-9; Sc. 32-35  $\frac{4-5}{11-12}$ ; eye as long as snout,  $3\frac{1}{3}$  to 4 times in length of head . . . . . [p. 290. 4. *H. nuchisquamulatus*, Hilg.,
- D. XV 9; A. III 8-9; Sc. 32-34  $\frac{6}{12}$ ; eye a little longer than snout, 3 times in length of head . . . . . 5. *H. jeanneli*, Pellegr., p. 291.
- B. Teeth in 3 to 5 series; caudal peduncle  $1\frac{1}{3}$  to 2 times as long as deep.
1. Pectoral as long as head or a little shorter, extending to vertical of origin of anal or a little beyond.
- a. Interorbital width less than diameter of eye.
- D. XIV-XVI 9-10; A. III 8-9; Sc. 30-33  $\frac{3\frac{1}{2}-4\frac{1}{2}}{11-12}$ ; 8 or 9 gill-rakers on lower part of anterior arch . . . . . [p. 292. 6. *H. angustifrons*, Blgr.,
- b. Interorbital width at least equal to diameter of eye.
- D. XV-XVI 9-10; A. III 8-9; Sc. 31-34  $\frac{5-6}{11-13}$ ; 8 or 9 gill-rakers on lower part of anterior arch; jaws equal in front . . . . . 7. *H. ishmaeli*, Blgr., p. 293.
- D. XV 10; A. III 9; Sc. 32  $\frac{5}{12}$ ; 7 gill-rakers; lower jaw slightly projecting . . . . . 8. *H. roberti*, Pellegr., p. 295.
- D. XIV-XVI 9-10; A. III 8-9; Sc. 30-34  $\frac{4-5}{11-12}$ ; 11-13 gill-rakers; lower jaw slightly projecting . . . . . 9. *H. stanleyi*, Blgr., p. 295.
2. Pectoral shorter than head, not extending to vertical of origin of anal.
- D. XIV-XVI 8-10; A. III 8-9; Sc. 31-32  $\frac{4-5}{13}$ . 10. *H. percoides*, Blgr., p. 296.
- II. Caudal fin rounded.
- A. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep; pectoral as long as or a little shorter than head, extending to vertical of origin of anal or a little beyond.
- D. XV-XVI 9-10; A. III 8-9; Sc. 30-34  $\frac{3-3\frac{1}{2}}{12-13}$ ; eye  $3\frac{1}{3}$  to  $4\frac{1}{3}$  times in length of head . . . 11. *H. graueri*, Blgr., p. 298.

B. Caudal peduncle not or but slightly longer than deep; pectoral usually shorter than head, rarely extending to vertical of origin of anal.

1. Lips moderate.

D. XIII-XV 8-10; A. III 6-8; Sc. 25-29  $\frac{2\frac{1}{2}-3}{10-11}$ ;

eye 3 to  $3\frac{1}{2}$  times in length of head . . . 12. *H. strigigena*, Pfeff., p. 299.

D. XIII-XIV (rarely XV) 9-11; A. III 8-10;

Sc. 26-31  $\frac{2\frac{1}{2}-3\frac{1}{2}}{10-11}$ ; eye  $3\frac{1}{2}$  to  $4\frac{1}{2}$  times in length

of head . . . . . 13. *H. moffati*, Casteln., p. 300.

D. XIV-XVI (rarely XIII) 8-12; A. III (rarely

IV) 8-11; Sc. 28-36  $\frac{3-5}{11-13}$ ; eye  $3\frac{1}{2}$  to 4 times [p. 302.

in length of head . . . . . 14. *H. desfontainesii*, Lacep.,

D. XVII-XIX 6-9; A. IV-VI 6-9; Sc. 32-

34  $\frac{3-5}{11-13}$ . . . . . 15. *H. alluaudi*, Pellegr., p. 305.

2. Lips much developed, thick.

D. XV-XVII 8-10; A. III 7-8; Sc. 29-

32  $\frac{3-3\frac{1}{2}}{11-12}$ . . . . . 16. *H. moeruensis*, Blgr., p. 306.

# 1. HAPLOCHROMIS LIVINGSTONII.

*Hemichromis livingstonii*, Günth. Proc. Zool. Soc. 1893, p. 625, pl. lvi. fig. B.

*Paratilapia livingstonii*, Bouleng. Proc. Zool. Soc. 1898, p. 145.

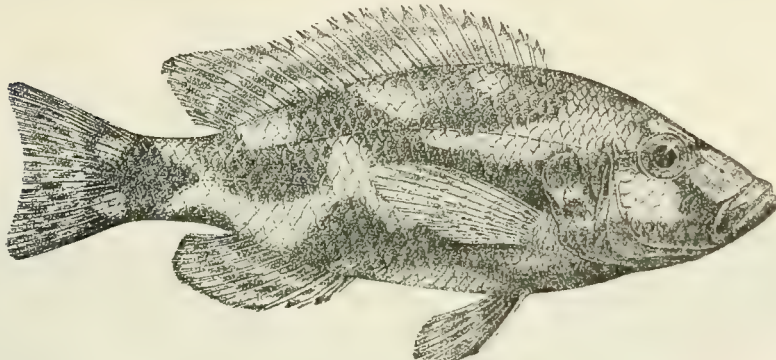
*Astatotilapia livingstonii*, Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 302.

*Haplochromis livingstonii*, Bouleng. Ann. & Mag. N. H. (8) ii. 1908, p. 241.

Depth of body nearly equal to length of head,  $2\frac{3}{4}$  to 3 times in total length. Snout with straight upper profile,  $1\frac{1}{2}$  to 2 diameters of eye, which is 4 to 5 times in length of head, 1 to  $1\frac{1}{2}$  times in interorbital width, and equal to or a little less than least depth of præorbital; lower jaw slightly projecting; mouth not extending to below anterior border of eye; outer teeth rather large, conical or indistinctly bicuspid in the adult, bicuspid in the young, 44 to 60 in upper jaw, followed by 3 or 4 series of small conical or tricuspid teeth; 4 series of scales on the cheek, width of scaly part equal to or greater than diameter of eye. Gill-rakers short, 11 or 12 on lower part of anterior arch. Dorsal XVI 10-11; spines increasing in length to the last, which measures  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; longest soft rays about  $\frac{1}{2}$  length of head. Anal III 9-10; third spine as long as or a little shorter than last dorsal. Pectoral  $\frac{4}{5}$  length of head. Ventral reaching vent. Caudal truncate or slightly emarginate, scaly in the adult. Caudal peduncle slightly

longer than deep. Scales finely denticulate,  $33-36 \frac{4-5}{12-13}$ ; lateral lines  $\frac{22-24}{13-16}$ . Silvery, largely and irregularly marbled with blackish, or olive speckled and spotted or marbled with dark brown; a dark bar may extend from below the eye to the angle of the mouth and two dark bars

Fig. 194.

*Haplochromis livingstonii*.

Type, after Günther (P. Z. S. 1893). ♂.

may be present across the head, from eye to eye; dorsal, caudal, and pectoral fins usually with round blackish spots; ventral and anal usually blackish.

Total length 190 millim.

Lake Nyassa and Upper Shire River.

1. Type.	L. Nyassa or Upper Shire.	Sir H. H. Johnston (P.).
2. Ad.	L. Nyassa.	Capt. E. L. Rhoades (P.).
3. Yg.	"	Dr. W. A. Cunningham (C.).
4. Ad.	Upper Shire.	Dr. Percy Rendall (C.); Sir H. H. Johnston (P.).

## 2. HAPLOCHROMIS VENUSTUS.

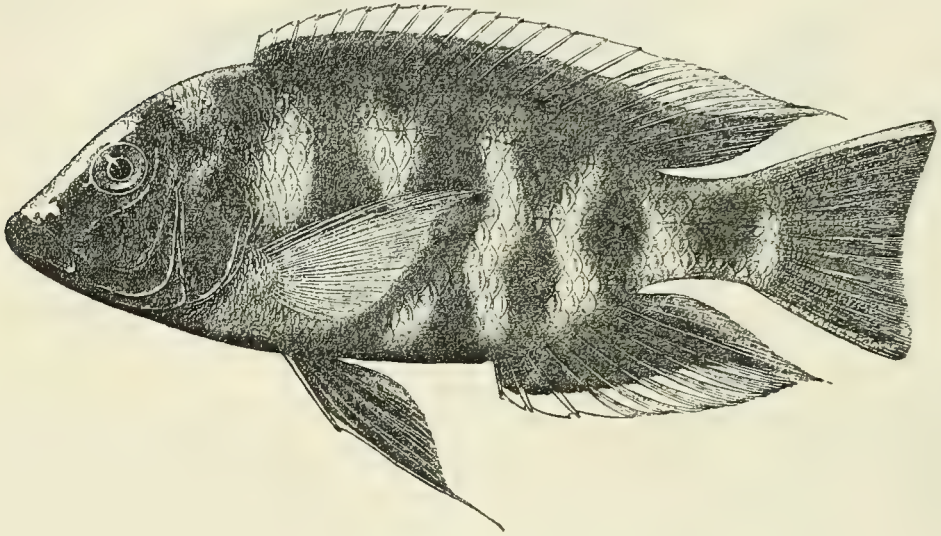
Bouleng. Ann. & Mag. N. H. (8) ii. 1908, p. 241.

Depth of body  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times in total length, length of head 3 times. Snout with straight upper profile,  $1\frac{1}{2}$  to  $1\frac{3}{4}$  diameters of eye, which is 4 to  $4\frac{1}{2}$  times in length of head,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times in interorbital width, and equal to or a little less than least depth of præorbital; lower jaw not projecting; mouth not extending to below anterior border of eye; outer teeth moderately large, all conical or some bicuspid, 56 to 74 in upper jaw, followed by 3 or 4 series of small conical teeth; 3 or 4 series of scales on the cheek, width of scaly part equal to or a little



greater than diameter of eye. Gill-rakers short, 11 or 12 on lower part of anterior arch. Dorsal XVI 10-11; spines increasing in length to the last, which measures  $\frac{1}{2}$  or a little less than  $\frac{1}{2}$  length of head; soft dorsal, as well as anal, prolonged, acutely pointed, longest ray  $\frac{2}{3}$  to nearly once length of head. Anal III 10; third spine shorter than last dorsal. Ventral produced into a filament, extending beyond origin

Fig. 195.

*Haplochromis venustus.*Type.  $\frac{2}{3}$ .

of anal. Caudal truncate or slightly emarginate, scaly. Caudal peduncle a little longer than deep. Scales finely denticulate, 32-35  $\frac{4-5}{14-16}$ ; lateral lines  $\frac{19-23}{15-16}$ . Peacock-blue in life, with large deep blue spots, dotted with red; top of head, and a broad edge to the fins orange, or dorsal almost entirely orange.

Total length 195 millim.

Lake Nyassa.

1-4. Types.

L. Nyassa.

Capt. E. L. Rhoades (P.).

5. Skel.

"

"

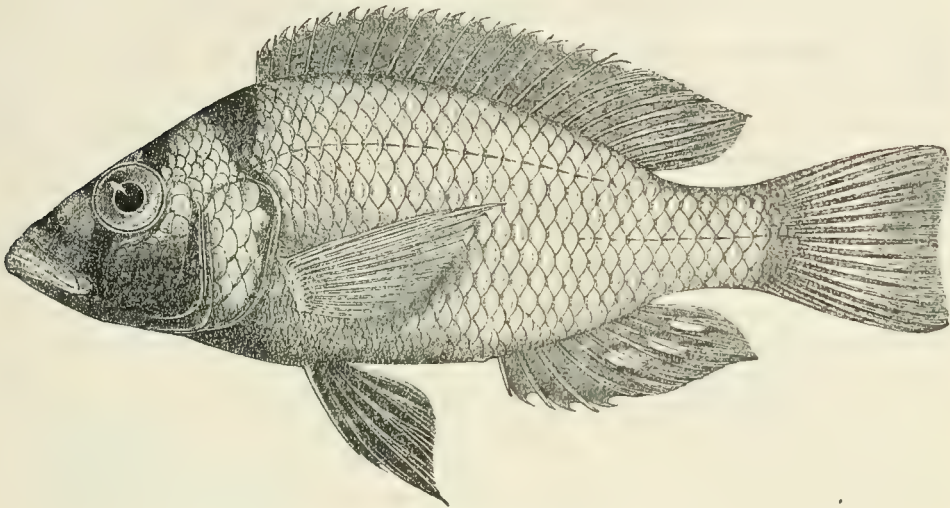
### 3. HAPLOCHROMIS SCHUBOTZI.

Bouleng. in Schubotz, Wiss. Ergebn. Deutsch. Z.-Afr. Exped. v., Zool. iii. p. 255, pl. viii. (1914).

Depth of body equal to length of head,  $2\frac{2}{3}$  to  $2\frac{4}{5}$  times in total length. Snout with straight or slightly convex upper profile,  $1\frac{1}{3}$  to

$1\frac{1}{2}$  diameters of eye, which is 4 to  $4\frac{1}{2}$  times in length of head, equals interorbital width, and exceeds least depth of præorbital; lower jaw slightly projecting; mouth extending to below anterior border of eye, or not quite so far; outer teeth rather small, conical or indistinctly bicuspid, 60 to 70 in upper jaw, followed by 3 series of very small

Fig. 196.

*Haplochromis schubotzi.*

Type (Deutsch. Z.-Afr. Exped.).

conical or tricuspid teeth; 3 or 4 series of scales on the cheek, width of scaly part equal to or a little less than diameter of eye. Gill-rakers short and thick, bi- or trifold, 8 or 9 on lower part of anterior arch. Dorsal XV–XVI 9; spines increasing in length to the last, which measures  $\frac{2}{5}$  length of head; longest soft rays  $\frac{1}{2}$  length of head. Anal III 8–9; third spine  $\frac{1}{3}$  length of head. Pectoral  $\frac{4}{5}$  to  $\frac{5}{6}$  length of head, extending to vertical of origin of anal. Ventral reaching origin of anal, or a little beyond. Caudal truncate or slightly emarginate. Caudal peduncle as long as deep or slightly longer than deep. Scales finely denticulate, 30–32  $\frac{3\frac{1}{2}-4}{12-13}$ ; lateral lines  $\frac{19-21}{10-12}$ ; scales on pectoral region very small. Brownish, throat, belly, and sides of head blackish brown or blotched with blackish brown; a black vertical bar from the eye to the mouth and another on the præoperculum; two blackish bars across the upper surface of the snout, a third across the occiput, and a fourth across the nape; vertical fins brown or blackish,

anal with two or three large bright ocellar spots; pectorals yellowish, ventrals black.

Total length 145 millim.

Lake Albert Edward.—Types in Berlin Museum.

1. One of the types. L. Albert Edward. Dr. H. Schubotz (C.) ; German C. African Expedition.

#### 4. HAPLOCHROMIS NUCHISQUAMULATUS.

*Chromis nuchisquamulatus*, Hilgend. Sitzb. Ges. naturf. Fr. Berl. 1888, p. 76.

*Chromis (Haplochromis) obliquidens*, Hilgend. l. c.

*Ctenochromis nuchisquamulatus*, Pfeff. Thierw. O.-Afr., Fische, p. 14 (1896).

*Ctenochromis sauvagei*, Pfeff. op. cit. p. 15.

*Ctenochromis obliquidens*, Pfeff. Arch. f. Naturg. lxiii. 1897, p. 60.

*Tilapia nuchisquamulata*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 5, and Proc. Zool.

Soc. 1899, p. 131 ; Pellegr. Mém. Soc. Zool. France, xvii. 1904, p. 183 (part.).

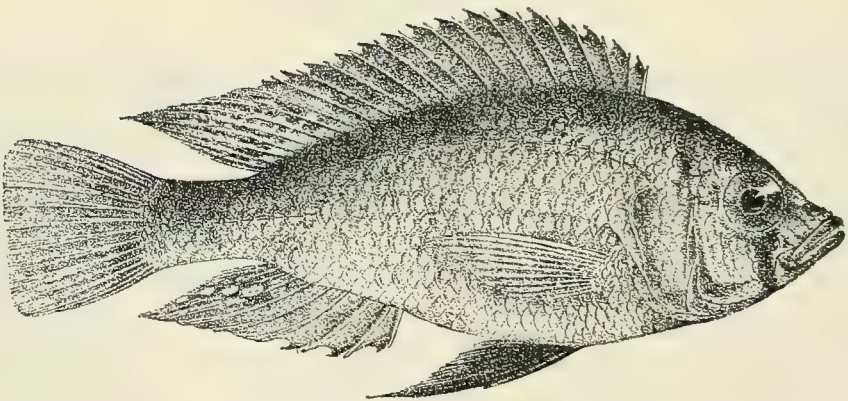
*Tilapia sauvagii*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 5.

*Tilapia obliquidens*, Bouleng. l. c.

*Haplochromis nuchisquamulatus*, Bouleng. Fish. Nile, p. 510, pl. xc. fig. 7 (1907).

Depth of body  $2\frac{1}{2}$  to 3 times in total length, length of head  $2\frac{4}{5}$  to  $3\frac{1}{4}$  times. Snout with straight or slightly convex upper profile, as long

Fig. 197.



*Haplochromis nuchisquamulatus*.

Entebbe (F. N.).

as eye, which is  $3\frac{1}{3}$  to 4 times in length of head, equal to or a little less than interorbital width, and  $1\frac{1}{2}$  to 2 times least depth of præorbital; jaws equal in front; maxillary extending to below anterior border of eye; outer teeth rather large, more or less distinctly bicuspid, or partly



conical, 50 to 60 in upper jaw, followed by 4 to 6 series of very numerous minute tricuspid teeth; 3 or 4 series of scales on the cheek, width of scaly part equal to or a little less than diameter of eye. Gill-rakers short, 8 to 10 on lower part of anterior arch. Dorsal XV–XVI 9–10; spines increasing in length to the last, which measures  $\frac{2}{5}$  to  $\frac{3}{5}$  length of head; longest soft rays  $\frac{3}{5}$  to  $\frac{3}{4}$  length of head. Anal III 8–9; third spine stronger but a little shorter than last dorsal. Pectoral  $\frac{3}{4}$  to once length of head, extending to vertical of origin of anal, or a little beyond. Ventral reaching vent, origin of anal, or beyond. Caudal truncate. Caudal peduncle not or but very little longer than deep. Scales strongly denticulate, 32–35  $\frac{4-5}{11-12}$ ; scales on occiput and nape very small, in 6 or 7 series between first dorsal spine and lateral line; lateral lines  $\frac{19-22}{8-13}$ . Olive or brownish, with or without ill-defined dark cross-bars, with or without an interrupted dark lateral stripe; a blackish opercular spot; a blackish vertical bar below the anterior third of the eye; one or two more or less distinct dark bars across the snout; fins greyish, dorsal edged with blackish; anal pink or red in males, with 2 to 4 orange ocellar spots on the posterior half; ventrals yellow in females, black in males.

Total length 125 millim.

Lake Victoria.—Types in Berlin Museum.

1–5. Ad.	Entebbe.	Mr. E. Degen (C.).
6. Ad.	Bunjako.	"
7. Ad.	Buddu Coast.	Mr. M. Simon (C.).
8. Skel.	"	"
9–17. Ad., hgr., & yg.	Kisumu Bay, Kavirondo.	A. Blayney Percival, Esq. (P.).
18–20. Yg.	Kavirondo.	Prof. O. Neumann (C.).

##### 5. HAPLOCHROMIS JEANNELI.

*Astatotilapia jeanneli*, Pellegr. Bull. Soc. Zool. France, xxxvii. 1913, p. 313.

Depth of body equal to length of head, about 3 times in total length. Snout shorter than eye, which is 3 times in length of head and a little exceeds interorbital width; jaws equal in front; mouth extending a little beyond vertical of anterior border of eye; 5 or 6 series of teeth, outer mostly conical; 4 series of scales on the cheek. 8 gill-rakers on lower part of anterior arch. Dorsal XV 9; spines subequal from the sixth,  $\frac{2}{5}$  length of head. Anal III 8–9; third spine as long as but stronger than longest dorsal. Pectoral nearly as long as head, extending



to vertical of origin of anal. Ventral reaching anal. Caudal truncate. Caudal peduncle  $1\frac{1}{5}$  times as long as deep. Scales denticulate, 32–34  $\frac{6}{12}$ ; lateral lines  $\frac{20-21}{12-13}$ . Back olive, sides and belly silvery; two black bands along the body, the upper above the lateral line; fins yellow.

Total length 93 millim.

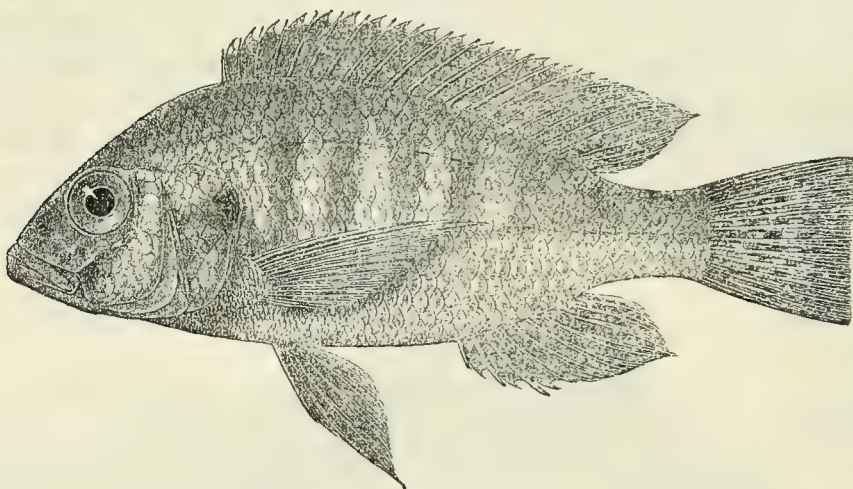
Lake Victoria.—Types in Paris Museum.

#### 6. HAPLOCHROMIS ANGUSTIFRONS.

Bouleng. in Schubotz, Wiss. Ergebn. Deutsch. Z.-Afr. Exped. v., Zool. iii. p. 256, pl. ix. (1914).

Depth of body  $2\frac{1}{2}$  to  $3\frac{1}{4}$  times in total length, length of head  $2\frac{3}{4}$  to 3 times. Snout with straight or slightly convex upper profile, as long as

Fig. 198.



*Haplochromis angustifrons.*

Type (Deutsch. Z.-Afr. Exped.).

eye, or a little shorter in the young; eye 3 to  $3\frac{1}{2}$  times in length of head, exceeding interorbital width and præorbital depth; jaws equal or lower slightly projecting; mouth extending to below anterior border of eye or a little beyond; teeth small, in 3 or 4 series, outer largest and conical or bicuspid, or partly conical and partly bicuspid, 48 to 60 in upper jaw, the others tricuspid; 3 or 4 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, 8 or 9 on lower part of anterior arch. Dorsal XIV–XVI 9–10; spines increasing in length to the last, which measures  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Anal III 8–9; third spine nearly as long as and

stronger than last dorsal. Pectoral as long as head or a little shorter, extending to vertical of origin of anal or a little beyond. Ventral reaching origin of anal or a little beyond. Caudal truncate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. Scales rather strongly denticulate, 30–33  $\frac{3\frac{1}{2}-4\frac{1}{2}}{13-14}$ ; lateral lines  $\frac{18-23}{10-15}$ ; scales on pectoral region very minute. Males brown above, sometimes with very indistinct darker cross-bars, silvery beneath, more or less profusely powdered with dark brown, or entirely dark brown; fins grey to blackish, caudal sometimes with round black spots, or perfectly black. Females brown above and white beneath, sometimes with a broad dark brown lateral band extending from the gill-cover to the caudal, sometimes with indistinct dark cross-bands; fins whitish or grey, dorsal with a few dark spots, caudal sometimes with round dark spots.

Total length 110 millim.

Lake Albert Edward and Lake Kivu.—Types in Berlin Museum.

- |  |                    |                              |
|--|--------------------|------------------------------|
| 1–5. Types.                                  | L. Albert Edward.  | Dr. H. Schubotz (C.); German |
|  |                    | C. African Expedition.       |
| 6. Skel.                                     | "                  | " "                          |
| 7–11. Types of var. <i>gracilior</i> , Blgr. | Kissenge, L. Kivu, | " "                          |

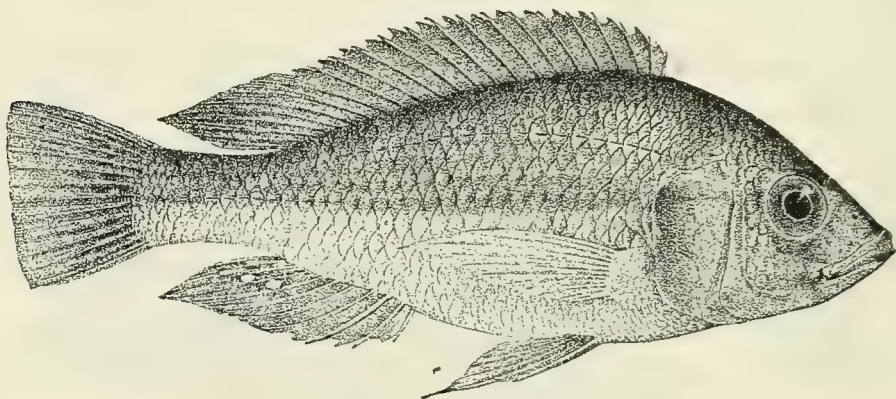
#### 7. HAPLOCHROMIS ISHMAELI.

Bouleng. Ann. & Mag. N. H. (7) xvii. 1906, p. 446, Fishes Nile, p. 509, pl. xc. fig. 6 (1907), and Ann. Mus. Genova, (3) v. 1911, p. 71.

Depth of body equal to or a little greater than the length of the head, which is  $2\frac{2}{3}$  to 3 times in total length. Snout with straight or slightly convex upper profile, 1 to  $1\frac{1}{3}$  times as long as eye, which is  $3\frac{1}{2}$  to 4 times in length of head,  $\frac{4}{5}$  to once interorbital width, and  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times least depth of præorbital; lower jaw not projecting; mouth not very oblique, extending to below anterior border of eye; teeth very small, in 3 to 5 series in both jaws, the outer largest and mostly bicuspid, 36 to 60 in upper jaw, the others tricuspid; 3 or 4 series of scales on the cheek, width of scaly part below eye equal to or a little less than diameter of eye. Gill-rakers short, 8 or 9 on lower part of anterior arch. Dorsal XV–XVI 9–10; spines equal from the eighth or ninth, or slightly increasing in length to the last, which measures  $\frac{1}{3}$  to  $\frac{1}{2}$  length of head; longest soft ray  $\frac{1}{2}$  to  $\frac{3}{4}$  length of head. Anal III 8–9; third spine nearly as long as and stronger than last dorsal. Pectoral as long as head or a little shorter, reaching vertical of origin of anal or a little

beyond. Ventral reaching origin of anal or a little beyond. Caudal truncate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. Scales feebly denticulate,  $31-34 \frac{5-6}{11-13}$ ; lateral lines  $\frac{19-22}{10-15}$ . Females pale olive-brown above, silvery white below; a brown or black opercular spot; a brown vertical bar sometimes present below the anterior third of the eye; ill-defined, barely distinguishable, dark cross-bars on the back; dorsal and caudal fins greyish, with or without round darker spots; ventral and anal fins bright yellow, the former sometimes blackish on the outer border, the latter sometimes with two large orange ocellar spots; lower half of caudal fin sometimes bright yellow. Males darker, grey or blackish on the belly; two dark bars across the snout; dorsal

Fig. 199.

*Haplochromis ishmaeli.*

Type (F. N.).

fin grey, the soft portion with round light spots; ventral fins black; two to four large orange ocellar spots on the anal fin.

Total length 130 millim.

Lake Victoria and Victoria Nile.

1-9, 10. Types.	Bunjako.	Mr. E. Degen (C.).
11. Skel.	"	"
12. Type.	Entebbe.	"
13, 14-15. Ad.	Buddu Coast of L. Victoria.	Mr. M. Simon (C.).
14-17. Hgr. & yg.	Kisumu Bay, Kavirondo.	A. Blayney Percival, Esq. (P.).
18-22. Ad. & hgr.	Jinja, Ripon Falls.	Dr. E. Bayon (C.); Genoa Museum (P.).
23. Skel.	" "	" "
24. Skel.	Kakindu, Victoria Nile.	" "



## 8. HAPLOCHROMIS ROBERTI.

*Astatotilapia roberti*, Pellegr. Bull. Soc. Zool. France, xxxvii. 1913, p. 312.

Depth of body equal to length of head,  $2\frac{4}{5}$  times in total length. Snout a little longer than eye, which is  $3\frac{1}{2}$  times in length of head and equals interorbital width; lower jaw slightly projecting; mouth extending to below anterior border of eye; teeth in 4 series, outer mostly bicuspid, the others tricuspid; 5 series of scales on the cheek. 7 gill-rakers on lower part of anterior arch. Dorsal XV 10; spines increasing in length to the last, which measures nearly  $\frac{2}{5}$  length of head. Anal III 9; third spine as long as last dorsal. Pectoral  $\frac{4}{5}$  length of head, extending to vertical of origin of anal. Ventral reaching anal. Caudal truncate. Caudal peduncle  $1\frac{1}{2}$  times as long as deep. Scales denticulate, 32  $\frac{5}{12}$ ; lateral lines  $\frac{20}{13}$ . Olive above, silvery on the sides, white beneath; 10 dark bars on the sides; soft dorsal and caudal with dark dots; ventrals and anal yellow.

Total length 115 millim.

Lake Victoria.—Type in Paris Museum.

## 9. HAPLOCHROMIS STANLEYI.

Bouleng. Ann. & Mag. N. H. (7) xvii. 1906, p. 444, Fish. Nile, p. 507, pl. xc. fig. 5 (1907), and Ann. Mus. Genova, (3) v. 1911, p. 71.

*Tilapia stanleyi*, Pellegr. Mém. Soc. Zool. France, xxii. 1910, p. 293.

*Tilapia stanleyi*, var. *uniformis*, Pellegr. l. c.

Depth of body equal to or a little greater than length of head, which is 3 to  $3\frac{1}{3}$  times in total length. Upper profile of head straight or slightly concave; snout as long as eye, which is  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times in length of head, equals interorbital width, and is twice or nearly twice as great as least depth of præorbital; lower jaw slightly projecting; maxillary extending to below anterior border of eye; outer teeth rather large, conical or rather indistinctly bicuspid, 40 to 60 in upper jaw, followed by two or three series of minute tricuspid teeth; 3 series of scales on the cheek, width of scaly part much less than diameter of eye. Gill-rakers rather long, some T-shaped, 11 to 13 on lower part of anterior arch. Dorsal XIV–XVI 9–10; spines equal from the sixth or seventh, or last longest,  $\frac{1}{3}$  to  $\frac{1}{2}$  length of head; longest soft ray  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Anal III 8–9; third spine as long as or a little longer than longest dorsal. Pectoral as long as head, reaching origin of anal. Ventral extending to vent or beyond origin of anal. Caudal truncate or slightly emarginate. Caudal peduncle  $1\frac{1}{2}$  to 2 times

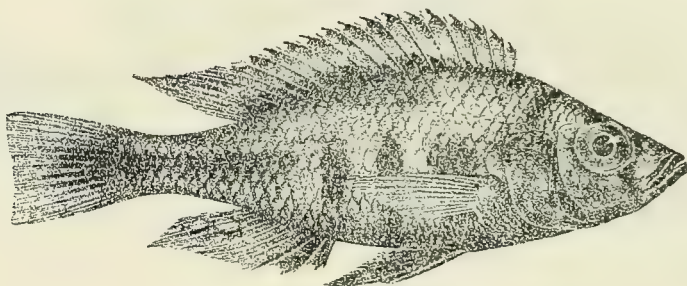


as long as deep. Scales strongly denticulate, 30-34  $\frac{4-5}{11-12}$ ; lateral lines  $\frac{19-22}{10-13}$ . Most males reddish brown above, greyish beneath; throat and opercle blackish; a V-shaped blackish band, pointing forwards, on the nape; a blackish vertical bar below the anterior border of the eye; ill-defined blackish spots on the side of the body, partly confluent into one or two longitudinal bands; dorsal grey, anal yellow, both blackish at the base, the latter with two or three large orange ocellar spots encircled with red; caudal fin greyish, blackish in the middle; ventral fins black. Females brownish above, with rather indistinct dark cross-bars, with the subocular bar less distinct, and the ventrals yellowish. Some specimens entirely dark brown or blackish.

Total length 120 millim.

Lake Victoria and Victoria Nile.

Fig. 200.



*Haplochromis stanleyi*.

Type (F. N.).

1-2. Types.	Buganga.	Mr. E. Degen (C.).
3-4. Types.	Bunjako.	"
5-8. Types.	Entebbe.	"
9. Ad.	"	M. C. Alluaud (C.); Paris Museum (E.).
10-12. Ad.	Sesse Islands.	Dr. E. Bayon (C.); Genoa Museum (P.).
13-14. Ad.	Jinja, Ripon Falls.	" "
15. Ad.	Kakindu, Victoria Nile.	" "

#### 10. HAPLOCHROMIS PERCOIDES.

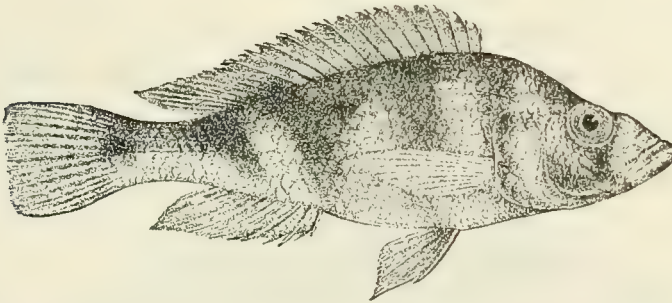
Bouleng. Ann. & Mag. N. H. (7) xvii. 1906, p. 443, Fish. Nile, p. 496, pl. xc. fig. 1 (1907), and Ann. Mus. Genova, (3) v. 1911, p. 70.

*Astatotilapia nigrescens*, Pellegr. Bull. Soc. Zool. France, xxxiv. 1909, p. 157, and Mém. Soc. Zool. France, xxii. 1910, p. 292, pl. xiv. fig. 3.

*Haplochromis nigrescens*, Bouleng. Ann. Mus. Genova, (3) v. 1911, p. 70.

Depth of body 3 to  $3\frac{1}{2}$  times in total length, length of head  $2\frac{2}{3}$  to 3 times. Snout with convex upper profile, as long as or a little longer than eye, which is  $3\frac{2}{3}$  to 4 times in length of head, 1 to  $1\frac{1}{4}$  times in interorbital width, and exceeds least depth of præorbital; lower jaw projecting; maxillary extending to below anterior border of eye; outer teeth moderate or rather large, unicuspid or more or less distinctly bicuspid, 36 to 50 in the upper jaw, followed by 2 or 3 series of minute tricuspid teeth; 4 or 5 series of scales on the cheek, width of scaly part below the eye equal to diameter of eye. Gill-rakers moderate and stout, 8 or 9 on lower part of anterior arch. Dorsal XIV–XVI 8–10; spines increasing in length to the last, which measures nearly  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; longest soft rays nearly half length of head. Anal III

Fig. 201.

*Haplochromis percoides.*

Type (F. N.).

8–9; third spine as long as and stronger than last dorsal. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not reaching vertical of origin of anal. Ventral reaching vent. Caudal truncate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. Scales strongly denticulate, 31–32  $\frac{4-5}{13}$ ; lateral lines  $\frac{19-21}{11-15}$ . Dark olive above, yellow below; four dark brown transverse bands on the body and a dark brown blotch at the base of the caudal fin; a dark brown bar across the forehead, and another, vertical, below the eye; dorsal fin light olive-brown with a darker longitudinal streak on its posterior portion; pectoral, ventral, and anal fins yellow, the last with an orange spot with dark centre. Some specimens dark olive, with the markings absent or very indistinct.

Total length 110 millim.

Lake Victoria and Victoria Nile.

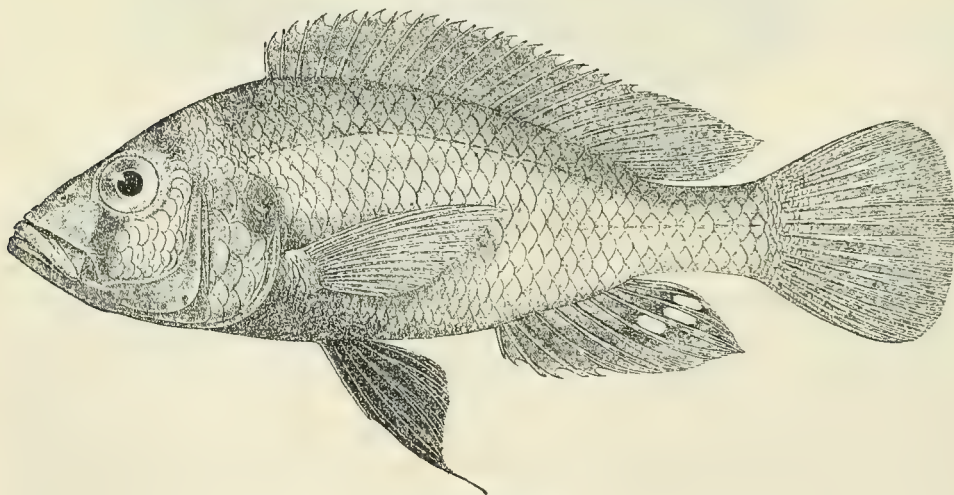
1-2. Types.	Entebbe.	Mr. E. Degen (C.).
3. Hgr.	Bululo, L. Kioga.	Dr. E. Bayon (C.); Genoa Museum (P.).
4-5. Ad.	Kakindu, Victoria Nile.	" "

## 11. HAPLOCHROMIS GRAUERI.

Bouleng. in Schubotz, Wiss. Ergebn. Deutsch. Z.-Afr. Exped. v., Zool. iii. p. 257, pl. x. (1914).

Depth of body  $2\frac{2}{3}$  to 3 times in total length, length of head  $2\frac{1}{2}$  to  $2\frac{4}{5}$  times. Snout with straight or slightly convex upper profile, 1 to  $1\frac{2}{5}$  diameters of eye, which is  $3\frac{1}{2}$  to  $4\frac{1}{3}$  times in length of head and equals interorbital width; least depth of præorbital  $\frac{2}{3}$  to once diameter of eye; mouth not extending to below anterior border of eye; teeth in 4 to 6 series, outer largest, conical, bicuspid, or partly conical and partly bicuspid, 50 to 80 in upper jaw; 3 or 4 series of scales on the cheek, width of scaly part equal to or a little less than diameter of eye. Gill-rakers short, the larger often bi- or trifold, 7 to 9 on lower part of

Fig. 202.

*Haplochromis graueri.*

Type (Deutsch. Z.-Afr. Exped.).  $\frac{5}{6}$ .

anterior arch. Dorsal XV-XVI 9-10; spines increasing in length to the last, which measures  $\frac{2}{3}$  to nearly  $\frac{1}{2}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Anal III 8-9; third spine as long as or a little shorter than last dorsal. Pectoral a little shorter than head, extending to vertical of origin of anal or a little beyond. Ventral reaching origin



of anal or beyond. Caudal rounded. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. Scales feebly denticulate, 30-34  $\frac{3-3\frac{1}{2}}{12-13}$ ; lateral lines  $\frac{18-22}{10-12}$ . Males grey or brown, with or without darker bars on the sides, the belly sometimes blackish; a dark vertical bar below the eye; vertical fins dark brown, anal sometimes with two or three large bright ocellar spots; ventrals black or blackish. Females uniform brown above and white beneath, with a more or less distinct dark opercular spot; fins greyish, soft dorsal and caudal with small round lower spots.

Total length 150 millim.

Lake Kivu.—Types in Berlin Museum.

1-2. Two of the types.

L. Kivu.

Dr. H. Schubotz (C.);

German C. African Exped.

## 12. HAPLOCHROMIS STRIGIGENA.

*Ctenochromis strigigena*, Pfeff. Jahrb. Hamb. Wiss. Anst. x. 1893, p. 155, pl. ii. figs. 5-8, and Thierw. O.-Afr., Fische, p. 18, fig. (1896).

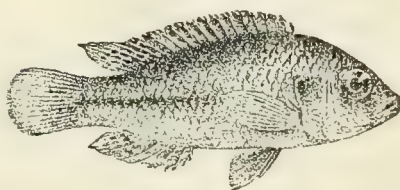
*Chromis multicolor*, Schoeller, Bl. Aq. Terr. K. xiv. 1903, p. 185, fig.

*Paratilapia multicolor*, Hilgend. Sitzb. Ges. naturf. Fr. Berlin, 1903, p. 429.

*Haplochromis strigigena*, Bouleng. Fish. Nile, p. 497, pl. xc. fig. 2 (1907).

Depth of body equal to length of head,  $2\frac{2}{3}$  to 3 times in total length. Snout with straight or slightly convex profile, as long as or a little

Fig. 203.



*Haplochromis strigigena*.

Alexandria (F. N.).

shorter than eye, which is 3 to  $3\frac{1}{2}$  times in length of head and equals interorbital width; maxillary extending to below anterior border of eye; 3 or 4 series of small, closely-set teeth in each jaw, those of the outer series a little larger, bicuspid in females and young, unicuspid in males; 3 series of scales on the cheek, width of scaly part a little less than diameter of eye. Gill-rakers very short, 7 to 9 on lower part of anterior arch. Dorsal XIII-XV 8-10; spines subequal or increasing slightly in length posteriorly, the last about  $\frac{1}{3}$  length of head; soft portion rounded, longest ray  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Anal III 6-8;



third spine as long as or a little longer than last dorsal, about  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head. Pectoral  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head, not reaching origin of anal. Ventral rarely reaching anal. Caudal rounded. Caudal peduncle as long as deep. Scales rather strongly denticulate,  $25-29 \frac{2\frac{1}{2}-3}{10-11}$ ; lateral lines  $\frac{10-19}{6-12}$ , often represented merely by pits instead of tubules. Greyish or olive, with or without more or less regular dark vertical bars and with or without an interrupted blackish stripe along the side of the body; a dark bar often extends from below the anterior third of the eye to the mouth; a black spot on the operculum and another at the root of the caudal fin; vertical fins with small dark spots; soft dorsal and anal fins dark in the males, with transverse series of white spots, which may be confluent into streaks; males sometimes with dark bars across the caudal fin, and with a red spot at the end of the anal fin.

Total length 70 millim.

Lower Egypt to Uganda and German East Africa.—Types in Hamburg Museum.

1-5, 6-7. Ad.	L. Mareotis, near Alexandria.	H. Schoeller, Esq. (P.).
8-21, 22. Ad., hgr., & yg.	Kaka, White Nile.	L. Loat, Esq. (C.).
23-32, 33-42, 43-57. Ad., hgr., & yg.	Gharb-el-Aish, White Nile.	„
58-67. Ad. & yg.	Fashoda, White Nile.	„
68. Ad.	Gondokoro, Bahr-el-Gebel.	„
69-70. Ad.	Bujiju, South Buddu, Uganda.	M. T. Dawe, Esq. (P.).
71. Ad.	L. Mohasi, Ruanda, W. of L. Victoria.	Dr. H. Schubotz (C.); German C. African Exped.
72. One of the types.	Mbusini, German E. Africa.	Dr. Stuhlmann (C.); Hamburg Museum (E.).

### 13. HAPLOCHROMIS MOFFATI.

*Chromys moffati*, Casteln. Cat. Poiss. Afr. Austr. p. 16 (1861).

*Chromis (Ctenochromis) philander*, M. Weber, Zool. Jahrb., Syst. x. 1897, p. 148.

*Paratilapia moffati*, Bouleng. Proc. Zool. Soc. 1898, p. 140; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 259.

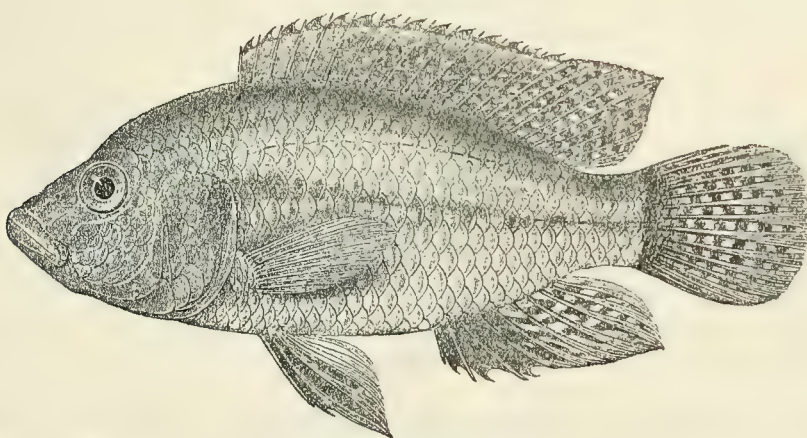
*Tilapia philander*, Bouleng. Proc. Zool. Soc. 1899, p. 136; Pellegr. t. c. p. 340.

*Haplochromis moffati*, Bouleng. Fish. Nile, p. 504 (1907), and Tr. Zool. Soc. xviii. 1911, p. 415; Schreitmüller, Bl. Aq. Terr. K. xxiii. 1912, p. 724, fig.

Depth of body nearly equal to length of head,  $2\frac{1}{2}$  to  $2\frac{4}{5}$  times in total length. Snout with straight or slightly convex upper profile, longer

than eye, which is  $3\frac{1}{2}$  to  $4\frac{1}{2}$  times in length of head and equals inter-orbital width; maxillary extending to below anterior border of eye; teeth in 3 or 4 series, outer larger and conical or more or less distinctly bicuspid, inner usually tricuspid, sometimes conical; 3 or 4 series of scales on the cheek, width of scaly part equal to or a little less or a little more than diameter of eye. Gill-rakers short, 7 to 10 on lower part of anterior arch. Dorsal XIII-XIV (rarely XV) 9-11; spines subequal or increasing in length posteriorly, last  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Anal III 8-10; third spine as long as or a little shorter than longest dorsal. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not reaching vertical of origin of anal. Ventral reaching vent

Fig. 204.



*Haplochromis moffati*.  
Indukuduku, Zululand.

or origin of anal. Caudal rounded. Caudal peduncle as long as deep. Scales denticulate, 26-31  $\frac{2\frac{1}{2}-3\frac{1}{2}}{10-12}$ ; lateral lines  $\frac{10-12}{6-13}$ . Olive or brownish, uniform or with pearl-coloured dots, or with ill-defined darker cross-bars, with or without an interrupted dark lateral band; a black opercular spot; sometimes a dark bar below the eye; spinous dorsal dark-edged, at least anteriorly; soft dorsal, anal, and caudal with small dark and light spots; anal rarely with light ocellar spots.

Total length 110 millim.

South Africa, Upper tributaries of Congo (Katanga).—Type apparently lost.

1-6, 7-16. Ad. &      Nr. Durban.  
hgr.

Rev. N. Abraham (P.).

17. Ad.	Pietermaritzburg.	Dr. E. Warren (P.).
18-19. Ad.	Indukuduku, Zululand.	"
20. Ad.	L. Sibayi, "	"
21. Ad.	Ngoyo Hills, "	Mr. C. Grant (C.) ; C. D. Rudd, Esq. (P.)
22-27. Ad.	Umfulosi Station, Zululand.	" "
28. Skel.	" "	" "
29. Ad.	Wondergat, nr. Mafeking.	Dr. J. D. F. Gilchrist (P.).
30. Ad.	L. Ngami district.	R. B. Woosnam, Esq. (P.).
31-33, 34-35. Ad. & hgr.	Pretoria.	W. L. Distant, Esq. (P.).
36-38. Ad.	"	G. A. Boulenger, Esq. (P.).
39-41. Ad.	S.W. of Middelburg, Trans- vaal.	S. Pershouse, Esq. (P.).
42. Ad.	Groot Olifants R., Transvaal.	Major G. E. Bruce (C.).
43. Ad.	Moramba R., affl. of Zambesi, Rhodesia.	S. African Museum (P.).
44. Ad.	Mozambique.	Mr. J. Paul Arnold (P.).
45. Hgr.	Luapula R. at Kasenga, Katanga.	Dr. L. Stappers (C.).
46-51. Hgr. & yg.	Elisabethville, Katanga.	"
52. Ad.	Labumbashi R., near Elisa- bethville.	"
53. Ad.	L. Mweru at Nkola.	"
54-55. Yg.	L. Mweru at Lukonzolwa.	"

This fish completely connects the preceding species with the following, and it is not unlikely all three will have to be united. I am unable to distinguish some specimens of *H. strigigena* from young *H. moffati*.

#### 14. HAPLOCHROMIS DESFONTAINESII.

*Labrus desfontainii*, Lacep. Hist. Poiss. iv. pp. 54 & 160 (1802).

*Sparus? desfontainii*, Gerv. Zool. Pal. Gén. p. 208, pl. xlv. fig. 4 (1869).

*Chronis desfontainii*, Sauv. Bull. Soc. Philom. (7) i. 1877, p. 160 ; Vincig. Ann. Mus. Genova, xx. 1884, p. 429 ; Rolland, Rev. Scientif. (4) ii. 1894, p. 418, fig.

*Hemichromis bloyeti*, Sauv. Bull. Soc. Philom. (7) vii. 1883, p. 159.

*Chronis flavii-josephi*, Lortet, Arch. Mus. Lyon, iii. 1883, p. 141, pl. viii. fig. 2.

*Hemichromis gigliolii*, Pfeff. Thierw. O.-Afr., Fische, p. 24 (1896).

*Paratilapia bloyeti*, Bouleng. Proc. Zool. Soc. 1898, p. 143, and Poiss. Bass. Congo, p. 418 (1901).

*Tilapia desfontainesi*, Bouleng. Proc. Zool. Soc. 1899, p. 135, pl. xi. fig. 3.



*Tilapia flavii-josephi*, Bouleng. l. c.

*Paratilapia wingatii*, Bouleng. Ann. & Mag. N. H. (7) x. 1902, p. 264.

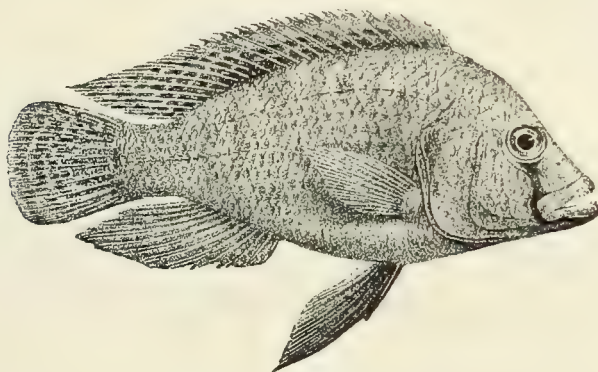
*Astatotilapia desfontainesi*, Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 300, and xxii. 1910, p. 291.

*Tilapia (Ctenochromis) sparsidens*, Hilgend. Zool. Jahrb., Syst. xxii. 1905, p. 408.

*Haplochromis desfontainesi*, Bouleng. Fish. Nile, p. 501, pl. xc. fig. 3 (1907), and Ann. Mus. Genova, (3) v. 1911, p. 71.

Depth of body  $2\frac{1}{3}$  to 3 times in total length, length of head  $2\frac{2}{3}$  to  $3\frac{1}{3}$  times. Snout with straight or slightly concave profile, 1 to  $1\frac{1}{2}$  diameters of the eye, which is  $3\frac{1}{2}$  to  $4\frac{1}{3}$  times in length of head and equals or slightly exceeds interorbital width; least depth of præorbital  $\frac{2}{3}$  to once diameter of eye; jaws equal in front, or lower slightly projecting;

Fig. 205.



*Haplochromis desfontainesi*.  
Tunisia (P. Z. S. 1899).

maxillary extending to below anterior border or anterior third of eye; outer teeth rather large, conical or more or less distinctly bicuspid in the adult, usually bicuspid in the young, 30 to 60 in upper jaw, followed by 2 or 3 series of small tricuspid teeth; 3 to 5 series of scales on the cheek, width of scaly part nearly equal to or greater than diameter of eye. Gill-rakers very short, the larger sometimes T-shaped, 7 to 10 on lower part of anterior arch. Dorsal XIV-XVI (rarely XIII) 9-10 (rarely 8, 11, or 12) spines, subequal from the tenth or increasing in length to the last, which measures  $\frac{2}{5}$  to  $\frac{3}{5}$  length of head; longest soft rays  $\frac{1}{2}$  to nearly once length of head. Anal III (rarely IV) 8-10 (rarely 11); third spine as long as or a little shorter than last dorsal. Pectoral  $\frac{2}{3}$  to nearly once length of head. Ventral reaching vent, origin



of anal, or beyond. Caudal rounded. Caudal peduncle as long as or a little longer than deep. Scales strongly denticulate, 28–36  $\frac{3-5}{11-13}$ ; lateral lines  $\frac{17-22}{6-15}$ . Brownish to olive-green, with or without rather indistinct dark cross-bands, sometimes with an interrupted dark lateral band from the eye to the root of the caudal fin; a more or less distinct dark brown or black bar below the anterior third of the eye; often two dark streaks across the snout; a dark opercular spot; vertical fins with or without more or less distinct small dark and light spots, the dorsal often edged with black in the males; anal, in males, often with several yellow or orange ocelli, edged with red; ventrals yellow in the females, black or blackish in the males; some specimens entirely dark brown or black.

Total length 150 millim.

From the Northern border of the Sahara and Syria to Lakes Victoria and Tanganyika, and German East Africa.—Types in Paris Museum.

1–20, 21–30. Ad., hgr., & yg.	Tepid Springs of Ain Oumash, near Biskra.	Lord Walsingham (P.).
31–32. Ad.	Hot Springs of Cafsa, Tunisia.	Marquis G. Doria (P.).
33–35. Ad.	Cafsa, Tunisia.	J. S. Whitaker, Esq. (P.).
36. Skel.	" "	"
37–38. Ad.	Tozeur Oasis, S. Tunisia.	Dr. C. Gaillard (P.).
39–40. Types of <i>C. flavii-josephi</i> .	Ain-el-Tabigah, Syria.	Dr. L. Lortet (P.).
41. Type of <i>P. win-</i> <i>gatii</i> .	Gondokoro, Bahr-el-Gebel.	L. Loat, Esq. (C.).
42–47. Yg.	" "	"
48. Hgr.	Butyaba, L. Albert.	Paris Museum (E.).
49. Hgr.	L. Albert.	Dr. H. Schubotz (C.) ; German C. African Exped.
50. Ad.	Hima R., E. foot of Mt. Ruwenzori.	Sir F. J. Jackson (P.).
51–53. Ad.	Victoria Nile, between L. Kioga and Murchison Falls.	F. H. Melland, Esq. (P.).
54–56. Ad.	L. Salisbury.	Sir F. J. Jackson (P.).
57–60. Ad.	Bululo, L. Kiogo.	Dr. E. Bayon (C.) ; Genoa Museum (P.).
61–62. Ad.	Kakindu, Victoria Nile.	" "
63. Skel.	" "	" "
64–78. Ad. & hgr.	Jinja, Ripon Falls.	" "
79. Skel.	" "	" "
80–87. Ad.	L. Victoria.	Col. Delmé Radcliffe (P.).
88. Skel.	"	"

89-120, 121-130.	Entebbe.	Mr. E. Degen (C.).
Ad. & hgr.		
131-136. Ad.	Sesse Ids.	Dr. E. Bayon (C.) ; Genoa Museum (P.).
137. Ad.	Buganga.	Mr. E. Degen (C.).
138. Ad.	Buddu Coast of L. Victoria.	Mr. M. Simon (C.).
139-147. Hgr. & yg.	L. Gangu, S. of L. Victoria.	C. W. Woodhouse, Esq. (P.).
148-149. Ad.	L. Kivu.	Prof. J. E. S. Moore (C.).
150. Ad.	„	Dr. H. Schubotz (C.) ; German C. African Exped.
151-153. Ad. & hgr.	Lufuko R. at Mpala, Lake Tanganyika.	Dr. L. Stappers (C.).
154. Type of <i>H.</i> <i>bloyeti</i> .	Kandoa, German E. Africa.	Capt. Bloyet (C.) ; Paris Museum (E.).
155-158. Types of <i>T. sparsidens</i> .	L. Manyara, German E. Africa.	Prof. O. Neumann (C.).
159-160. Yg.	Umbugwe, German E. Africa.	„

## 15. HAPLOCHROMIS ALLUAUDI.

*Astatoreochromis alluaudi*, Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 385, xvii. 1905, p. 185, pl. xvi. fig. 2, and xxii. 1910, p. 297.

*Ihaplochromis alhuaudi*, Bouleng. Fish. Nile, p. 505, pl. xc. fig. 4 (1907), and Ann. Mus. Genova, (3) v. 1911, p. 71.

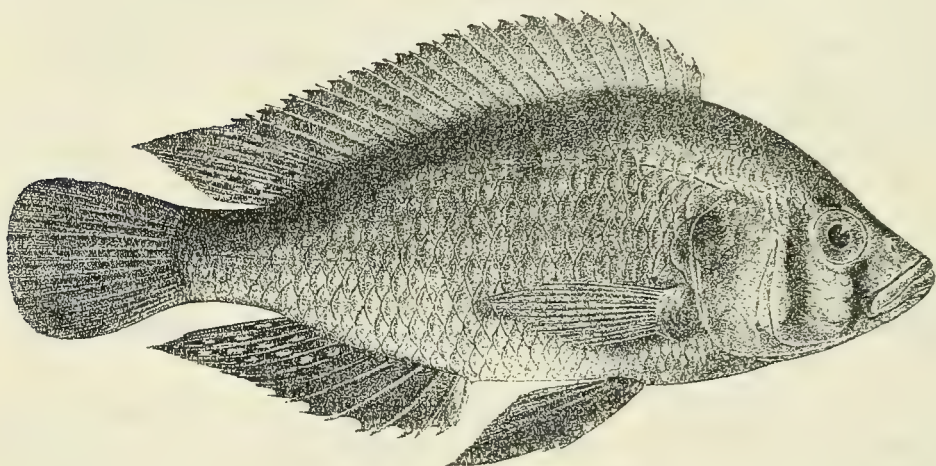
Depth of body equal to or a little greater than length of head,  $2\frac{2}{5}$  to 3 times in total length. Snout with straight or slightly convex profile, as long as eye in the young, a little longer in the adult; diameter of eye  $3\frac{1}{2}$  (young) to  $4\frac{1}{2}$  times in length of head, 1 (young) to  $1\frac{1}{2}$  times in interorbital width,  $1\frac{1}{4}$  to  $1\frac{1}{3}$  times least depth of suborbital; jaws equal in front, or lower slightly projecting; maxillary extending to below anterior border of eye or a little beyond; outer teeth rather large, partly conical and partly bicuspid in the adult, bicuspid in the young, 40 to 50 in upper jaw, followed by 1 or 2 series of minute tricuspid teeth; 4 or 5 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers very short, 8 to 10 on lower part of anterior arch. Dorsal XVII-XIX 6-9; spines increasing in length to the last, which measures  $\frac{2}{5}$  to  $\frac{3}{5}$  length of the head; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{4}$  length of head. Anal IV-VI 6-9; last spine as long as or a little shorter than last dorsal. Pectoral  $\frac{2}{3}$  to  $\frac{4}{5}$  length of head, not extending quite to origin of anal. Ventral reaching beyond origin of anal. Caudal rounded.

Caudal peduncle as long as or slightly longer than deep. Scales strongly denticulate, 32-34  $\frac{3-4}{11-13}$ ; lateral lines  $\frac{16-22}{10-14}$ . Olive or brownish, with or without ill-defined dark cross-bars; some young specimens dark steel-grey, nearly black on the top of the back and head; a black or blackish vertical bar below the anterior third of the eye, another, sometimes, from behind the eye to the angle of the præoperculum; vertical fins dark, with more or less distinct small darker spots; dorsal and anal fins usually edged with blackish; anal, in the males, with two or three transverse series of light, dark-edged ocellar spots.

Total length 155 millimetres.

Lake Victoria and Victoria Nile.—Types in Paris Museum.

Fig. 206.



*Haplochromis alluaudi*.

Type (F. N.).

1. One of the types.	Kavirondo Bay.	M. C. Alluaud (C.) ; Paris Museum (E.).
2-6. Ad.	Entebbe.	Mr. E. Degen (C.).
7. Skel.	"	"
8. Ad.	Bunjako.	"
9-13. Ad.	Buddu Coast of L. Victoria.	Mr. M. Simon (C.).
14. Ad.	L. Victoria.	Col. Delmé Radcliffe (P.).
15-17. Hgr. & yg.	L. Gangu, E. of L. Victoria.	C. W. Woodhouse, Esq. (C.).
18-19. Ad.	Jinja, Ripon Falls.	Dr. E. Bayon (C.) ; Genoa Museum (P.).
20-21. Ad.	Kakindu, Victoria Nile.	" "



22. Skel.	Kakindu, Victoria Nile.	Dr. E. Bayon (C.); Genoa Museum (P.).
23. Ad.	Bululo, L. Kioga.	" "
24. Ad.	Victoria Nile, between L. Kioga and Murchison Falls.	F. H. Melland, Esq. (P.).

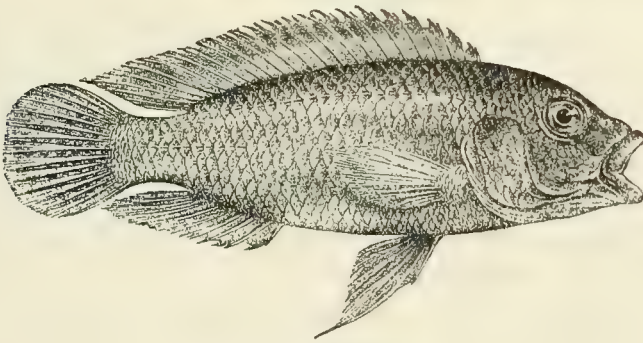
This species is completely connected with *H. desfontainesii*.

#### 16. HAPLOCHROMIS MOERUENSIS.

*Paratilapia moeruensis*, Bouleng. Ann. Mus. Congo, Zool. i. p. 119, pl. xlv. fig. 2 (1899), and Poiss. Bass. Congo, p. 419 (1911); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 262.

Depth of body equal to length of head, 3 to  $3\frac{1}{4}$  times in total length. Snout with convex upper profile, as long as or a little longer than eye,

Fig. 207.



*Haplochromis moeruensis*.

Type (A. M. C. 1899).

which is  $3\frac{1}{2}$  to  $4\frac{1}{2}$  times in length of head and equals interorbital width; mouth not extending quite to below anterior border of eye; lips thick, much developed; teeth in 4 or 5 series, outer larger and conical or more or less distinctly bicuspid, 36 to 48 in upper jaw; 3 or 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 7 to 10 on lower part of anterior arch. Dorsal XV-XVII 8-10; spines increasing in length to the last, which measures about  $\frac{2}{3}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Anal III 7-8; third spine as long as longest dorsal. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not extending to vertical of origin of anal. Ventral produced into a filament, reaching vent or anal. Caudal rounded. Caudal peduncle as long as deep. Scales more or less distinctly denticulate, 29-32  $\frac{3-3\frac{1}{2}}{11-12}$ ; lateral lines  $\frac{18-22}{9-12}$ . Olive-brown; a blackish opercular spot; a more or less distinct dark band above the upper lateral line and another behind



the opercular spot, or very indistinct dark cross-bars on the back; fins brown, spinous dorsal with a black edge.

Total length 95 millim.

Lake Mweru.—Types in Congo Museum, Tervueren.

1-2. Types.	L. Mweru.	Capt. Lemaire (C.).
3-8. Ad. & hgr.	„ at Lukonzolwa.	Dr. L. Stappers (C.).
9. Skel.	„ „	„

### 11. PARATILAPIA.

Bleek. Verh. Ak. Amsterd. ii. 1868, p. 307; Bouleng. Proc. Zool. Soc. 1898, p. 137 (part.), and Poiss. Bass. Congo, p. 412 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 256; Bouleng. Fish. Nile, p. 466 (1907).

*Paracara*, Bleek. Versl. Ak. Amsterd. xii. 1878, p. 193.

*Haplotilapia*, Hilgend. Sitzb. Ges. nat. Fr. Berl. 1888, p. 77.

*Hemichromis*, part., Pfeff. Thierw. O.-Afr., Fische, p. 19 (1896).

*Boulengerochromis*, Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 304.

Body short or more or less elongate; scales cycloid or ctenoid; two lateral lines both incomplete, or the upper nearly complete. Two or more series of teeth, the outer conical and sometimes canine-like in the adult, sometimes bicuspid in the young, the others unicuspid or tricuspid; maxillary usually exposed when the mouth is closed. Dorsal with 10-18 spines, anal with 3. Parietal and occipital crests strong, extending to between the orbits. Vertebrae 27-37\*.

Africa and Syria.

- 
- \* 13+14=27. *P. polleni*.  
 14+15=29. *P. chrysonota*.  
 14+16=30. *P. retrodens*.  
 14+17=31. *P. granti*, *intermedia*, *serranus*, *vittata*.  
 14+18=32. *P. longirostris*.  
 15+15=30. *P. smithii*.  
 15+16=31. *P. smithii*, *chrysonota*.  
 15+17=32. *P. crassilabris*, *guiarti*.  
 15+18=33. *P. dimidiata*.  
 16+16=32. *P. codringtoni*, *furcifer*.  
 16+17=33. *P. dimidiata*, *microlepis*.  
 16+18=34. *P. ventralis*.  
 17+16=33. *P. macrocephala*.  
 17+17=34. *P. calliura*.  
 17+18=35. *P. angusticeps*.  
 17+19=36. *P. thumbergii*.  
 18+18=36. *P. angusticeps*.  
 18+19=37. *P. thumbergii*.  
 19+18=37. *P. leptosoma*.

*Synopsis of the Species.*

- I. 7 to 14 gill-rakers on lower part of anterior arch; less than 50 scales in longitudinal series on the body.
- A. Præmaxillary processes very long, extending to between the orbits; caudal rounded or truncate.
1. Width of head not more than  $2\frac{1}{3}$  times in its length.
- a. Pectoral shorter than head.
- D. X-XIII 10-12; A. III 8-11; Sc. 28-  
 $30\frac{3\frac{1}{2}-4\frac{1}{2}}{12-13}$ ; 4 to 6 series of scales on the  
 cheek . . . . . 1. *P. polleni*, Blkr., p. 315.
- D. XIV-XV 10-11; A. III 7; Sc. 27-  
 $28\frac{3}{12}$ ; 3 or 4 series of scales on the cheek. 2. *P. cerasogaster*, Blgr., p. 316.
- D. XIV-XV 13-15; A. III 8-10; Sc. 34-  
 $36\frac{4\frac{1}{2}-5\frac{1}{2}}{12-14}$ ; 5 or 6 series of scales on the  
 cheek . . . . . 3. *P. macrocephala*, Blgr., p. 317.
- b. Pectoral at least nearly as long as head.
- D. XV-XVI 9-10; A. III 8-9; Sc.  $32\frac{4}{12}$ ;  
 3 or 4 series of scales on the cheek . . . 4. *P. gestri*, Blgr., p. 318.
- D. XV 13; A. III 9-10; Sc. 34-37  $\frac{4-4\frac{1}{2}}{11}$ ;  
 5 or 6 series of scales on the cheek . . . 5. *P. longimanus*, Blgr., p. 319.
2. Width of head  $2\frac{1}{3}$  to 3 times in its length; pectoral shorter than head.
- D. XIV-XVI 14-16; A. III 11-13; Sc. 36-  
 $39\frac{5-7}{12-18}$ ; lower jaw projecting; 7 to 10  
 series of scales on the cheek; caudal  
 peduncle as long as deep or a little longer  
 than deep . . . . . 6. *P. angusticeps*, Blgr., p. 320.
- D. XVI 9; A. III 8; Sc.  $33\frac{4}{14}$ ; jaws equal  
 in front; 4 series of scales on the cheek;  
 caudal peduncle slightly longer than deep. 7. *P. parvidens*, Blgr., p. 322.
- D. XVI 8-10; A. III 7-8; Sc. 32-33  $\frac{3-4}{9-10}$ ;  
 jaws equal in front; 3 or 4 series of scales  
 on the cheek; caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$   
 times as long as deep . . . . . 8. *P. pfefferi*, Blgr., p. 323.
- B. Præmaxillary processes not extending to between the orbits; caudal rounded, truncate, or slightly emarginate, not scaly.
1. Pharyngeal teeth all slender.
- a. Snout considerably longer than the eye in the adult; depth of body  
 $2\frac{2}{3}$  to  $4\frac{1}{3}$  times in total length.
- α. Caudal peduncle as long as deep or slightly longer than deep; head  
 2 to  $2\frac{1}{2}$  times as long as broad.

\* 3 to 5 series of scales on the cheek.

- D. XV 10; A. III 7; Sc.  $28 \frac{3}{10}$ ; 9 gill-rakers  
on lower part of anterior arch . . . . 9. *P. demeusii*, Blgr., p. 324.
- D. XVII 8; A. III 6-7; Sc.  $29-32 \frac{3}{10}$ ; 13 or  
14 gill-rakers; head twice as long as  
broad . . . . . 10. *P. afra*, Gthr., p. 325.
- D. XVI 10-11; A. III 8-9; Sc.  $32-34 \frac{3\frac{1}{2}-4}{12-13}$ ;  
10-12 gill-rakers; head  $2\frac{1}{3}$  to  $2\frac{1}{2}$  times  
as long as broad . . . . . 11. *P. modesta*, Gthr., p. 326.

\*\* 6 to 9 series of scales on the cheek.

- D. XVI 10; A. III 7; Sc.  $30 \frac{3}{13}$ ; 6 series of  
scales on the cheek . . . . . 12. *P. toddi*, Blgr., p. 327.
- D. XV-XVIII 13-16; A. III 10-12; Sc.  $35-41 \frac{4\frac{1}{2}-5\frac{1}{2}}{12-15}$ ; 7 to 9 series of scales on the  
cheek . . . . . 13. *P. thumbergii*, Cast., p. 328.

$\beta$ . Caudal peduncle  $1\frac{1}{3}$  to 2 times as long as deep.

\* 3 to 5 series of scales on the cheek; lips feebly or moderately developed.

† Lower jaw strongly projecting; head at least  $2\frac{1}{2}$  times as long as broad.

- D. XV-XVI 8-9; A. III 8-9; Sc.  $33-35 \frac{4}{11-12}$ ; head  $2\frac{2}{3}$  to 3 times as long as broad; mouth extending to below anterior border of eye . . . . . 14. *P. vittata*, Blgr., p. 330.
- D. XV 12; A. III 11; Sc.  $35 \frac{4}{11}$ ; head 4 times as long as broad; mouth not extending to below anterior border of eye . 15. *P. compressiceps*, Blgr., p. 331.
- D. XIV-XVI 9-10; A. III 8-10; Sc.  $33-40 \frac{4-6}{12-14}$ ; head  $2\frac{1}{2}$  to 3 times as long as broad; mouth not extending to below anterior border of eye; vertical diameter of scaly part of cheek greater than diameter of eye in adult . . . . . 16. *P. longirostris*, Hilg., p. 332.
- D. XIV-XVI 8-10; A. III 8-10; Sc.  $32-36 \frac{4-5}{11-14}$ ; head  $2\frac{1}{2}$  to  $2\frac{3}{4}$  times as long as broad; mouth not extending to below anterior border of eye; vertical diameter of scaly part of cheek not greater than diameter of eye . . . . . 17. *P. prognatha*, Pellegr., p. 333.

†† Lower jaw feebly projecting.

- D. XV-XVII 8-10; A. III 8-10; Sc. 33-  
 $45 \frac{4-6}{12-15}$ ; head  $2\frac{1}{5}$  to  $2\frac{1}{2}$  times as long as  
 broad; mouth extending to below anterior  
 border of eye; caudal truncate . . . . 18. *P. serranus*, Pfeff., p. 334.
- D. XVI-XVII 9-11; A. III 8-9; Sc. 38-  
 $41 \frac{4-5}{14-16}$ ; head  $2\frac{1}{3}$  to  $2\frac{1}{2}$  times as long as  
 broad; mouth not extending quite to below  
 anterior border of eye; caudal slightly  
 emarginate in the adult . . . . . 19. *P. guarti*, Pellegr., p. 336.
- D. XIV-XVI 9-10; A. III 9-10; Sc. 31-  
 $34 \frac{4-5}{10-12}$ ; head  $2\frac{1}{3}$  to  $2\frac{3}{4}$  times as long as  
 broad; mouth not extending to below  
 anterior border of eye; caudal subtrun-  
 cate . . . . . 20. *P. bayoni*, Blgr., p. 337.

\*\* 3 series of scales on the cheek; lips very thick, each produced  
 into a globular swelling.

- D. XVI-XVII 9; A. III 8-9; Sc. 31-32  $\frac{5}{12}$  . 21. *P. chilotes*, Blgr., p. 338.

\*\*\* 6 or 7 series of scales on the cheek.

- D. XV 11; A. III 9; Sc. 37  $\frac{7-8}{16}$  . . . . . 22. *P. pectoralis*, Blgr., p. 339.

b. Snout not or but slightly longer than eye; depth of body  $2\frac{1}{4}$  to  $3\frac{1}{4}$   
 times in total length.

α. Caudal peduncle longer than deep.

\* Lips moderately thick; snout as long as or slightly longer than  
 eye; last five dorsal spines nearly equal in length.

- D. XV 8; A. III 8; Sc. 33  $\frac{6}{12}$ ; teeth in 3 [p. 341.  
 series; lower jaw strongly projecting . . 23. *P. maculipinna*, Pellegr.,
- D. XV-XVI 9-10; A. III 8-9; Sc. 33-  
 $40 \frac{5-5\frac{1}{2}}{12-13}$ ; teeth in 4 or 5 series; jaws  
 equal in front . . . . . 24. *P. victoriana*, Pellegr., p. 341.
- D. XV-XVII 8-9; A. III 8-9; Sc. 30-  
 $35 \frac{4-5}{12-13}$ ; teeth in 6 to 8 series; jaws  
 equal in front . . . . . 25. *P. granti*, Blgr., p. 342.

\*\* Lips moderately thick; snout a little shorter than eye; dorsal  
 spines increasing in length to the last.

- D. XVI 8; A. III 8; Sc. 33  $\frac{5}{13}$ ; teeth in 4  
 series . . . . . 26. *P. cinerea*, Blgr., p. 344.



\*\*\* Lips very thick ; snout as long as or slightly longer than eye.

- D. XV-XVI 8-9 ; A. III 8-9 ; Sc. 31-33  $\frac{4}{13}$  ;  
teeth in 3 or 4 series, 20 to 34 in outer  
series of upper jaw . . . . . 27. *P. crassilabris*, Blgr., p. 345.
- D. XV-XVI 8-10 ; A. III 8-9 ; Sc. 31-  
35  $\frac{5-6}{11-13}$  ; teeth in 3 to 6 series, 30 to 50  
in outer series of upper jaw . . . . . 28. *P. bicolor*, Blgr., p. 346.
- D. XV-XVI 9-10 ; A. III 9-10 ; Sc. 34-  
40  $\frac{5-6}{13-15}$  ; teeth in 6 to 8 series, 26 to 40  
in outer series of upper jaw . . . . . 29. *P. retrodens*, Hilg., p. 347.
- D. XVI 9 ; A. III 8-9 ; Sc. 32-35  $\frac{5-6}{15-16}$  ;  
teeth in 7 to 10 series, 56 to 70 in outer  
series of upper jaw . . . . . 30. *P. polyodon*, Blgr., p. 349.

$\beta$ . Caudal peduncle not longer than deep.

- D. XIV 10 ; A. III 8 ; Sc. 27  $\frac{3}{10}$  ; caudal  
peduncle as long as deep . . . . . 31. *P. dorsalis*, Pellegr., p. 350.
- D. XV 10 ; A. III 9 ; Sc. 26-27  $\frac{2\frac{1}{2}}{11}$  ; caudal  
peduncle as long as deep . . . . . 32. *P. luebberti*, Hilg., p. 350.
- D. XIV 11-12 ; A. III 8 ; Sc. 29  $\frac{2\frac{1}{2}-3}{10}$  ; caudal  
peduncle deeper than long . . . . . 33. *P. corbali*, Blgr., p. 351.

2. Some of the pharyngeal teeth with spherical crowns ; depth of body  
2 to  $2\frac{2}{3}$  times in total length ; caudal rounded or subtruncate.

*a*. Snout shorter than postocular part of head ; 4 or 5 series of scales on  
the cheek.

- D. XV 14-15 ; A. III 10 ; Sc. 35-36  $\frac{4}{12}$ ,  
cycloid ; pectoral shorter than head ;  
caudal peduncle much deeper than  
long . . . . . 34. *P. codringtoni*, Blgr., p. 352.
- D. XV 12-13 ; A. III 9-10 ; Sc. 33-34  $\frac{4}{11}$ ,  
finely denticulate ; pectoral shorter than  
head ; caudal peduncle as long as deep or  
slightly deeper than long . . . . . 35. *P. carlottæ*, Blgr., p. 353.
- D. XV 12-13 ; A. III 10 ; Sc. 31-33  $\frac{3\frac{1}{2}}{11}$ ,  
cycloid ; pectoral as long as head ; caudal  
peduncle as long as deep or a little deeper  
than long . . . . . 36. *P. gibbiceps*, Blgr., p. 355.

b. Snout at least as long as postocular part of head ; pectoral shorter than head ; caudal peduncle as long as deep or a little deeper than long.

D. XV 13-14 ; A. III 8-9 ; Sc. 32-34  $\frac{3\frac{1}{2}}{11}$  ; eye 5 to  $5\frac{1}{2}$  times in length of head ; 50 to 60 teeth in outer series of upper jaw . . . 37. *P. frederici*, Cast., p. 355.

D. XIV-XV 12-13 ; A. III 8-9 ; Sc. 33-34  $\frac{3\frac{1}{2}}{10-11}$  ; eye 4 to  $4\frac{1}{2}$  times in length of head ; 52 to 64 teeth in outer series of upper jaw . . . . . 38. *P. smithii*, Cast., p. 357.

D. XV 13-14 ; A. III 9-10 ; Sc. 34-37  $\frac{3\frac{1}{2}-4\frac{1}{2}}{11-13}$  ; eye 4 to  $4\frac{1}{2}$  times in length of head ; 36 to 50 teeth in outer series of upper jaw. 39. *P. mellandi*, Blgr., p. 358.

C. Præmaxillary processes not extending to between the orbits ; caudal more or less distinctly emarginate, scaly.

D. XVII 10 ; A. III 9 ; Sc. 36  $\frac{3}{12}$  ; 3 series of scales on the cheek ; snout shorter than postocular part of head ; depth of body  $2\frac{2}{3}$  times in total length . . . . . 40. *P. nototenia*, Blgr., p. 359.

D. XVI-XVIII 10-12 ; A. III 10-11 ; Sc. 34-36  $\frac{3-4}{12-14}$  ; 4 or 5 series of scales on the cheek ; snout as long as postocular part of head ; depth of body 3 to  $3\frac{1}{2}$  times in total length . . . . . 41. *P. dimidiata*, Gthr., p. 360.

D. XVI-XVII 12 ; A. III 10-11 ; Sc. 37-38  $\frac{4-5}{12-14}$  ; 5 series of scales on the cheek ; snout as long as postocular part of head ; depth of body 3 times in total length . . 42. *P. rhoadesii*, Blgr., p. 361.

II. 15 to 28 gill-rakers on lower part of anterior arch, or if fewer more than 50 scales in longitudinal series on the body.

A. Præmaxillary processes not extending to between the orbits ; caudal more or less emarginate.

1. 29 to 38 scales in a longitudinal series on the body ; depth of body  $2\frac{1}{3}$  to 3 times in total length.

a. Dorsal with 15 to 18 spines.

D. XV-XVI 9-11 ; A. III 10-11 ; Sc. 32-34  $\frac{3-3\frac{1}{2}}{10-11}$  ; 17 to 20 gill-rakers ; eye  $2\frac{2}{3}$  to 3 times in length of head . . . . . 43. *P. chrysonota*, Blgr., p. 362.

D. XVI-XVIII 10-12; A. III 9-12; Sc. 33-

36  $\frac{3-4}{10-11}$ ; 23 to 27 gill-rakers; eye 3 to

4 times in length of head . . . . . 44. *P. intermedia*, Gthr., p. 363.

D. XV 11; A. III 9; Sc. 29-30  $\frac{3\frac{1}{2}}{10}$ ; 20 to 22

gill-rakers; eye  $5\frac{1}{2}$  times in length of

head . . . . . 45. *P. schwebischii*, Sauv., p. 365.

b. Dorsal with 12 or 13 spines; 15 to 19 gill-rakers; eye  $2\frac{2}{3}$  to  $2\frac{3}{4}$  times in length of head.

D. XII-XIII 12-14; A. III 9-10; Sc. 34-

36  $\frac{4}{13-14}$ ; pectoral as long as or a little

longer than head . . . . . 46. *P. ventralis*, Blgr., p. 365.

D. XII-XIII 12-13; A. III 9; Sc. 36-

38  $\frac{4}{13-14}$ ; pectoral a little shorter than

head . . . . . 47. *P. dewindti*, Blgr., p. 367.

2. 60 to 69 scales in longitudinal series; depth of body  $2\frac{3}{4}$  to 3 times in total length.

D. XIII-XIV 12-14; A. III 9; Sc. 60-

64  $\frac{4-6}{16-18}$ ; 15 or 16 gill-rakers . . . . . 48. *P. furcifera*, Blgr., p. 368.

D. XV 13; A. III 12-14; Sc. 60-69  $\frac{6}{13-16}$ ;

19 to 28 gill-rakers . . . . . 49. *P. stenosoma*, Blgr., p. 369.

3. 75 to 90 scales in longitudinal series; depth of body  $3\frac{1}{2}$  to 4 times in total length.

D. XVI-XVII 13-15; A. III 9-10; Sc. 75-

90  $\frac{9-10}{28-30}$ ; 13 to 15 gill-rakers . . . . . 50. *P. microlepis*, Blgr., p. 370.

B. Præmaxillary processes very long, extending to between the orbits; depth of body 4 to  $4\frac{1}{2}$  times in total length.

1. Caudal deeply notched; 20 gill-rakers; interorbital width equal to diameter of eye.

D. XII-XIV 14-16; A. III 10-12; Sc. 39-

42  $\frac{2-3}{11-13}$ ; eye  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times in length of

head . . . . . 51. *P. leptosoma*, Blgr., p. 372.

D. XV-XVII 11; A. III 8-9; Sc. 39-40  $\frac{3}{11}$ ;

eye  $3\frac{1}{2}$  times in length of head . . . . . 52. *P. nigripinnis*, Blgr., p. 373.

2. Caudal truncate or slightly emarginate; 15 gill-rakers; interorbital width barely half diameter of eye.

D. XVI-XVII 10; A. III 7-8; Sc. 37-

40  $\frac{2-3}{9-10}$ ; eye 3 to  $3\frac{1}{2}$  times in length of

head . . . . . 53. *P. calliura*, Blgr., p. 374.

## 1. PARATILAPIA POLLENI.

Bleek. Versl. Ak. Amsterd. ii. 1868, p. 307, and Poiss. Madag. p. 10, pl. v. fig. 2 (1875); Steind. Sitzb. Ak. Wien, lxxxii. i. 1880, p. 247; Sauv. Hist. Madag., Poiss. p. 443, pl. xlv. fig. 2 (1891); Bouleng. Proc. Zool. Soc. 1898, p. 138; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 257.

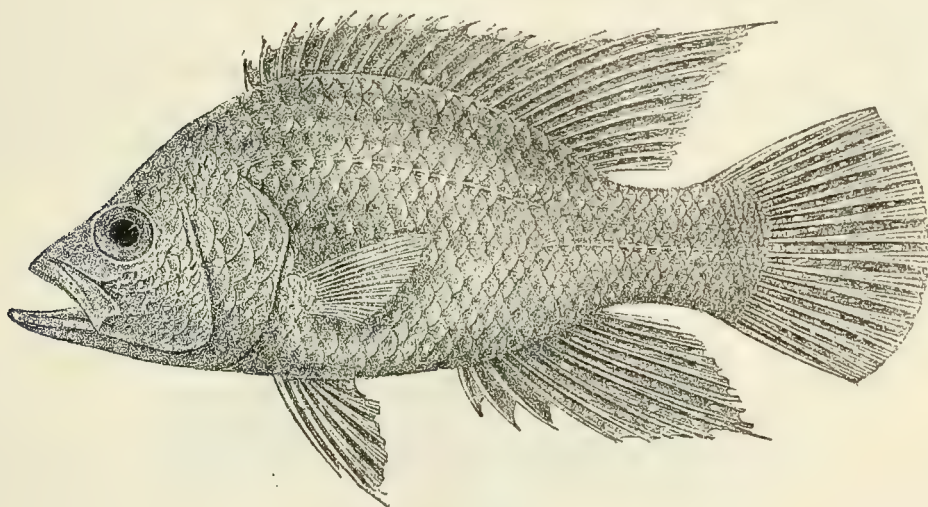
*Paracara typus*, Bleek. Versl. Ak. Amsterd. xii. 1878, p. 193, pl. iii. fig. 3; Sauv. op. cit. p. 438, pl. xlv. a, fig. 8, & c., fig. 1.

*Paratilapia bleekeri*, Sauv. op. cit. p. 444, pl. xlv. fig. 1; Bouleng. t. c. p. 139.

*Paratilapia typus*, Bouleng. l. c.

Depth of body 2 to  $2\frac{3}{4}$  times in total length, length of head  $2\frac{1}{2}$  to  $2\frac{4}{5}$  times. Head twice or a little less than twice as long as broad; snout

Fig. 208.



*Paratilapia polleni*.  
After Sauvage (op. cit.).

rounded, with straight or concave upper profile, as long as broad or broader than long, shorter than postocular part of head; eye  $3\frac{1}{2}$  (young) to 6 times in length of head, about  $\frac{2}{3}$  interorbital width in adult, equal to or greater than præorbital depth; mouth very protractile, extending to below anterior border or anterior third of eye; præmaxillary processes very long, extending to between the eyes; teeth in 3 to 5 series, outer largest, 30 to 50 in upper jaw; 4 to 6 series of scales on the cheek, width of scaly part equal to or greater than diameter of eye. Gill-rakers moderately long, 7 to 10 on lower part of anterior arch. Dorsal X–XIII 10–12; spines increasing in length to the last, which measures  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; middle soft rays more or less produced, some-



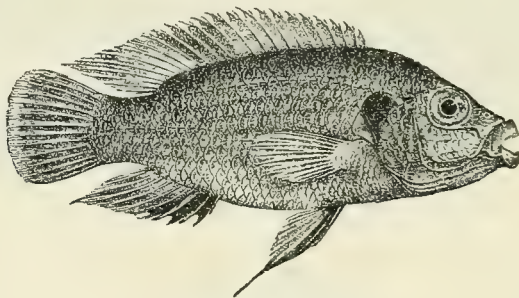
times as long as head. Anal III 8–11; third spine a little shorter but stouter than last dorsal. Pectoral  $\frac{2}{5}$  length of head, not extending to vertical of origin of anal. Ventral reaching vent or anal. Caudal rounded. Caudal peduncle nearly as long as deep. Scales usually finely denticulate, sometimes all cycloid, 28–30  $\frac{3\frac{1}{2}-4\frac{1}{2}}{12-13}$ ; lateral lines  $\frac{14-19}{10-14}$ . Dark brown or blackish, uniform or with bluish-white spots, or olive with more or less distinct dark cross-bars and a black opercular spot; fins blackish.

Total length 205 millim.

Madagascar.—Types in Leyden Museum.

1–3. Ad.	Tamatave.	Rev. W. Deans Cowan (C.).
4–6. Ad.	Mahanova.	
7, 8–9. Ad.	Imerina.	Rev. R. Baron (C.).
10. Skel.	„	„
11. Ad.	„	Paris Museum (E.).
12–13. Ad. & hgr.	Morafeno.	„
14. Hgr.	Madagascar.	M. V. de Robillard (C.).

Fig. 209.



*Paratilapia cerasogaster*.

Type (A. M. C.).  $\frac{5}{8}$ .

## 2. PARATILAPIA CERASOGASTER.

Bouleng. Ann. Mus. Congo, Zool. i. p. 118, pl. xlv. fig. 1 (1899), and Poiss. Bass. Congo, p. 420 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 260.

Depth of body equal to length of head,  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times in total length. Head  $2\frac{1}{3}$  times as long as broad; snout with straight upper profile, as long as broad, as long as eye, which is  $3\frac{1}{2}$  times in length of head, equals interorbital width, and exceeds præorbital depth; mouth with thick lips, not extending to below anterior border of eye; præmaxillary processes very long, extending to between the eyes; teeth in 4 or 5

series, of outer series rather large, 34 to 40 in upper jaw; 3 or 4 series of scales on the cheek, width of scaly part nearly equal to diameter of eye. Gill-rakers short, 9 or 10 on lower part of anterior arch. Dorsal XIV–XV 10–11; spines increasing in length to the last, which measures a little over  $\frac{1}{3}$  length of head; longest soft rays  $\frac{2}{3}$  length of head. Anal III 7; third spine stronger but a little shorter than last dorsal. Pectoral hardly  $\frac{2}{3}$  length of head, not extending to vertical of origin of anal. Ventral produced into a filament, reaching anal. Caudal rounded. Caudal peduncle as long as deep. Scales cycloid, 27–28  $\frac{3}{12}$ ; lateral lines  $\frac{17-19}{8-11}$ . Purplish brown above, cheek and opercle yellow, belly carmine-red; a large black spot on the operculum and another on the posterior part of the spinous dorsal, which is dark purplish; soft dorsal carmine-red; ventral carmine-red, edged with black.

Total length 80 millim.

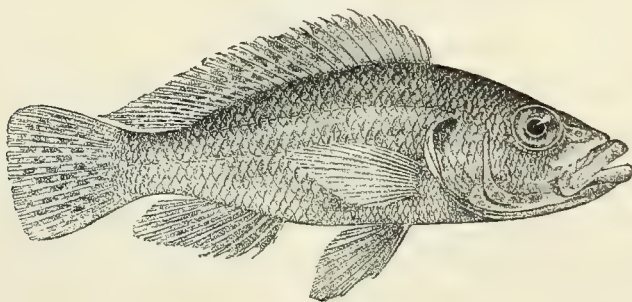
Upper Congo.—Types in Congo Museum, Tervueren.

1–2. Types.

Utanda, L. Leopold II.

M. P. Delhez (C.).

Fig. 210.



*Paratilapia macrocephala*.

Type (A. M. C.).

### 3. PARATILAPIA MACROCEPHALA.

Bouleng. Ann. Mus. Congo, Zool. i. p. 121, pl. xlv. fig. 4 (1899), and Poiss. Bass.

Congo, p. 415 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 266.

Depth of body  $2\frac{2}{3}$  to 3 times in total length, length of head  $2\frac{1}{2}$  to 3 times. Head  $2\frac{1}{4}$  to  $2\frac{1}{3}$  times as long as broad; snout with straight upper profile, a little shorter than postocular part of head; eye  $3\frac{1}{2}$  to  $4\frac{2}{3}$  times in length of head, equal to or greater than interorbital width, much exceeding præorbital depth; mouth extending to below anterior

border of eye; præmaxillary processes very long, extending to between the eyes; teeth small, in 2 or 3 series; 5 or 6 series of scales on the cheek, width of scaly part nearly equal to diameter of eye. Gill-rakers moderately long, 10 to 13 on lower part of anterior arch. Dorsal XIV–XV 13–15; spines subequal from the sixth,  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{4}{5}$  length of head. Anal III 8–10; third spine as long as or shorter than longest dorsals. Pectoral  $\frac{2}{3}$  to  $\frac{4}{5}$  length of head, extending to vertical of origin of anal. Ventral reaching anal. Caudal rounded. Caudal peduncle not or but scarcely longer than deep. Scales cycloid or indistinctly denticulate, 34–36  $\frac{4\frac{1}{2}-5\frac{1}{2}}{12-14}$ ; lateral lines  $\frac{22-25}{12-18}$ . Brown, with or without distinct dark vertical bars; a black opercular spot; dorsal and caudal fins, sometimes also anal, chequered with black and white, or with black spots confluent into streaks.

Total length 330 millim.

Lake Mweru and Luapula River.—Type in Congo Museum, Tervueren.

1–5. Ad. & hgr.	L. Mweru at Lukonzolwa.	Dr. L. Stappers (C.).
6. Skel.	”	”
7. Hgr.	” at Pakalulwa.	”
8. Hgr.	” south of Kilwa.	”
9–10. Ad. & yg.	Luapula R. at Kasenga.	”

#### 4. PARATILAPIA GESTRI.

Bouleng. Ann. Mus. Genova, (3) v. 1911, p. 67, pl. i. fig. 3.

Depth of body  $2\frac{3}{5}$  to  $2\frac{2}{3}$  times in total length, length of head 3 times. Head twice as long as broad; snout rounded, broader than long, with rather convex upper profile,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as eye, which is 4 times in length of head,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times in interorbital width, and exceeds least depth of præorbital; jaws equal in front; lips thick; præmaxillary processes extending to between eyes; mouth extending to below anterior border or anterior fourth of eye; teeth small, conical, in 3 series, 40 to 60 in outer row of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers rather short, 8 or 9 on lower part of anterior arch, the longest bifid. Dorsal XV–XVI 9–10; spines equal in length from the seventh, which measures  $\frac{2}{5}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Anal III 8–9; third spine longest, as long as and stronger than longest dorsal. Pectoral nearly as long as head, reaching or not vertical of origin of anal. Ventral reaching vent. Caudal rounded. Caudal peduncle as long as deep. Scales feebly denticulate, 32  $\frac{4}{12}$ ; lateral



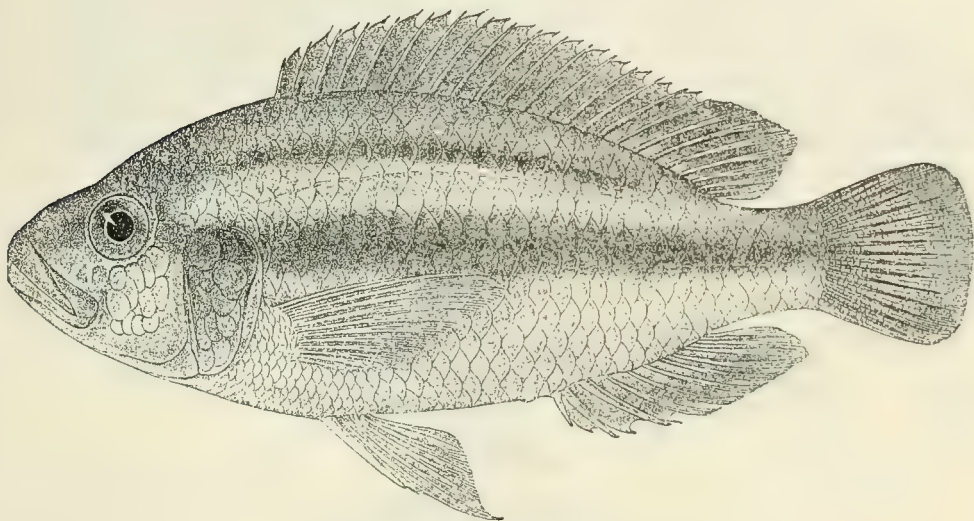
lines  $\frac{20}{8-12}$ . Brown above, yellowish below; two dark brown stripes on each side, the upper above the upper lateral line, the lower wider and extending from the eye to the caudal fin; dorsal, caudal, and pectoral brownish, other fins yellowish.

Total length 150 millim.

Lake Victoria and Victoria Nile.—Type in Genoa Museum.

1. Ad. L. Victoria. Dr. E. Bayon (C.); Genoa Museum (P.).

Fig. 211.



*Paratilapia gestri*.

Type (Ann. Mus. Gen. 1911).  $\frac{5}{8}$ .

##### 5. PARATILAPIA LONGIMANUS.

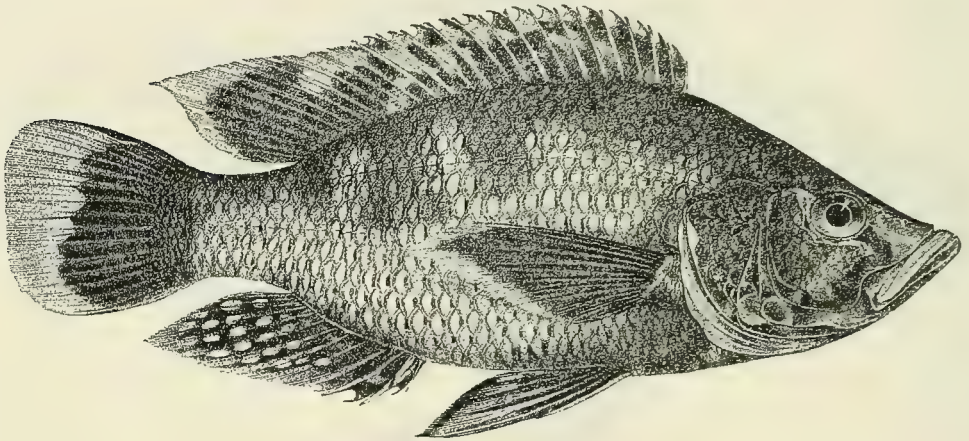
Bouleng. Tr. Zool. Soc. xviii. 1911, p. 411, pl. xl.

Depth of body  $2\frac{2}{3}$  to  $2\frac{3}{4}$  times in total length, length of head  $2\frac{2}{3}$  to 3 times. Head 2 to  $2\frac{1}{4}$  times as long as broad, upper profile straight or slightly concave; lower jaw slightly projecting beyond upper; snout obtusely pointed, as long as broad, shorter than postocular part of head; eye 4 to 5 times in length of head, equal to or slightly greater than interorbital width or præorbital depth; mouth very protractile, extending to below anterior border of eye; præmaxillary processes very long, extending to between the eyes; teeth small, in 2 or 3 series, 52 to 60 in outer series of upper jaw; 5 or 6 series of scales on the cheek, width of scaly part equal to or a little greater than diameter of eye. Gill-rakers short, posterior truncate or T-shaped, 9 to 11 on lower part of



anterior arch. Dorsal XV 13; spines increasing in length to the last, which is  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{4}$  length of head. Anal III 9-10; third spine  $\frac{1}{3}$  to  $\frac{1}{2}$  length of head. Pectoral as long as head, reaching vertical of origin of anal or beyond. Ventral reaching vent or anal. Caudal rounded. Caudal peduncle as long as deep. Scales not or but very indistinctly denticulate, 34-37  $\frac{4-4\frac{1}{2}}{11}$ ; lateral lines  $\frac{23-25}{14-15}$ . Females olive-brown above, yellowish beneath, with ill-defined or irregular darker cross-bands; vertical fins brown with round

Fig. 212.

*Paratilapia longimanus.*Type (Tr. Z. S. 1911).  $\frac{1}{2}$ .

darker spots; pectorals dark olive or blackish. Males dark brown to blackish, the scales on the body pale greyish brown in the centre, vertical fins and pectoral with a broad light edge, anal with round white spots.

Total length 240 millim.

Lake Ngami basin.

1-4. Types.

Okovango R.

R. B. Woosnam, Esq. (C.).

#### 6. PARATILAPIA ANGUSTICEPS.

? *Chromys levaillantii*, Casteln. Mém. Poiss. Afr. Austr. p. 16 (1861).

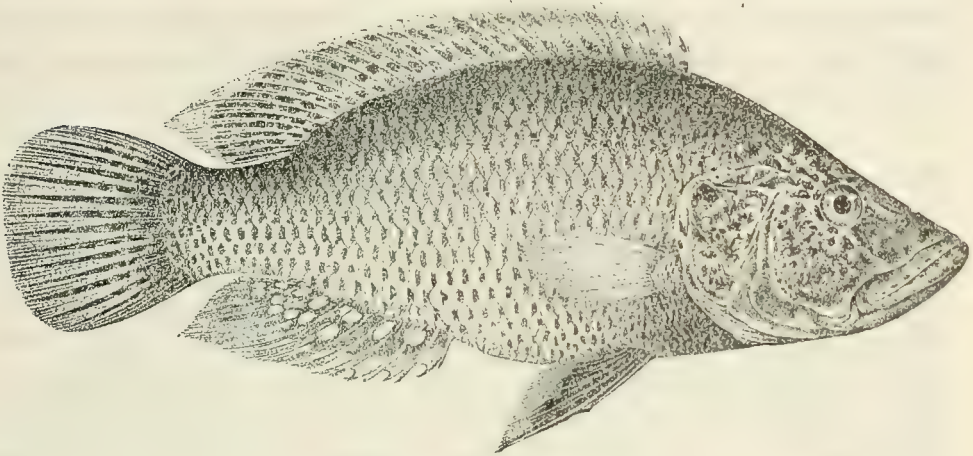
*Paratilapia angusticeps*, Bouleng. Ann. & Mag. N. H. (7) xx. 1907, p. 108, and Tr. Zool. Soc. xviii. 1911, p. 414, pl. xlii.

*Paratilapia kajuensis*, Bouleng. Ann. & Mag. N. H. (8) ii. 1908, p. 494.

Depth of body  $2\frac{2}{3}$  to 3 times in total length, length of head  $2\frac{3}{5}$  to 3 times. Head strongly compressed,  $2\frac{1}{2}$  to 3 times as long as broad,

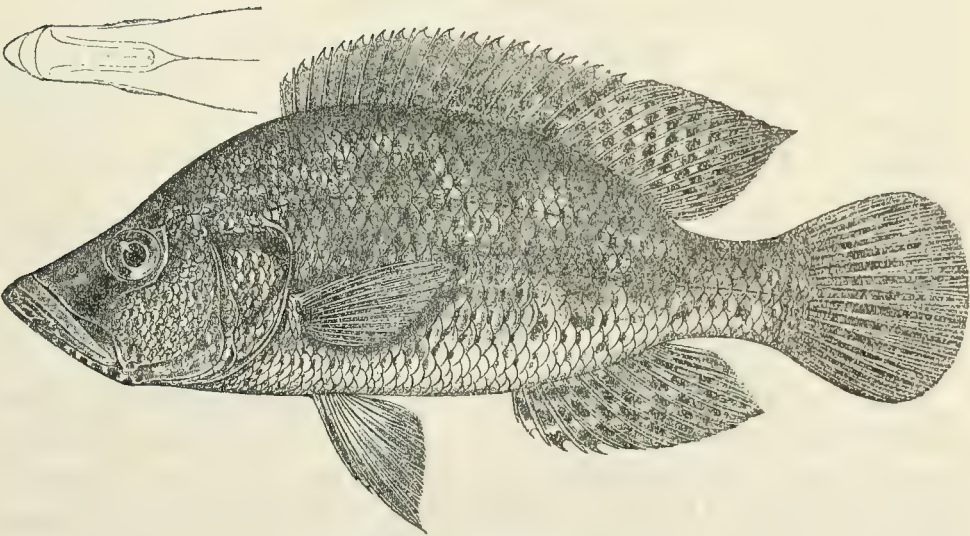
with concave upper profile; lower jaw projecting; snout pointed,  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times as long as broad, shorter than postocular part of head; eye  $3\frac{1}{2}$  (young) to  $6\frac{1}{2}$  times in length of head, equal to or a little less

Fig. 213.



*Paratilapia angusticeps*, male.  
Okovango R. (Tr. Z. S. 1911).  $\frac{1}{2}$ .

Fig. 214.



*Paratilapia angusticeps*, female.  
Type of *P. kafuensis*, Kafue R.  $\frac{1}{2}$ .

than interorbital width or least depth of præorbital; mouth very protractile, extending to below anterior border or anterior fourth of eye;

præmaxillary processes long, extending to between the eyes; teeth very small, in 3 or 4 series, 60 to 80 in outer series of upper jaw; 7 to 10 series of scales on the cheek, width of scaly part 1 to  $1\frac{3}{4}$  diameters of eye. Gill-rakers rather short, 11 or 12 on lower part of anterior arch. Dorsal XIV–XVI 14–16; spines increasing in length to the last, which measures  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; longest soft rays a little more or a little less than  $\frac{1}{2}$  length of head. Anal III 11–13; third spine as long as or a little shorter than last dorsal. Pectoral  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head, not extending to vertical of origin of anal. Ventral reaching vent or anal. Caudal rounded. Caudal peduncle as long as or a little longer than deep. Scales feebly denticulate in the young, sometimes perfectly cycloid in the adult, 36–39  $\frac{6-7}{12-18}$ ; lateral lines  $\frac{20-24}{13-18}$ . Females and young brownish above, yellowish beneath, with dark brown spots and dots or marblings, or with 7 or 8 indistinct dark bars on the body, rarely with a more or less distinct dark lateral stripe; a blackish opercular spot; dorsal, anal, and caudal fins with round brown or blackish spots. Males yellowish olive above, yellow beneath, each scale with a dark brown bar or spot; dorsal and anal edged with yellow, the latter with bright ocellar spots.

Total length 245 millim.

Angola, Bechuanaland, Zambesi, Lake Bangwelu.

1–12. Types.	Mossamedes.	Dr. W. J. Ansorge (C.).
13–17. Ad. & hgr.	Okovango R., near L. Ngami.	R. B. Woosnam, Esq. (C.).
18. Skel.	”	”
19. Type of <i>P. ka-fuensis</i> .	Kafue R., Zambesi.	T. Codrington, Esq. (P.).
20–22, 28–30. Ad.	L. Bangwelu.	F. W. Melland, Esq. (P.).

#### 7. PARATILAPIA PARVIDENS.

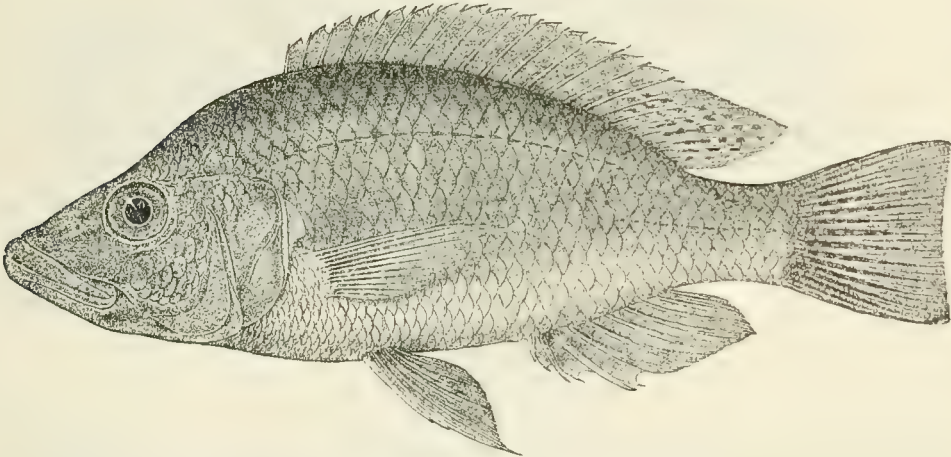
Bouleng. Ann. Mus. Genova, (3) v. 1911, p. 65, pl. i. fig. 1.

Depth of body  $2\frac{2}{3}$  times in total length, length of head  $2\frac{3}{4}$  times. Head nearly three times as long as broad; snout pointed, with nearly straight upper profile,  $1\frac{1}{2}$  times as long as eye, which is  $4\frac{1}{2}$  times in length of head,  $1\frac{1}{3}$  times in interorbital width, and slightly exceeds least depth of præorbital; jaws equal in front; præmaxillary processes extending to between the eyes; mouth extending to below anterior fourth of eye; teeth very small, conical, in 3 series; 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers rather short, 9 on lower part of anterior arch, the last large and anvil-shaped.



Dorsal XVI 9 ; spines increasing in length to the last, which measures  $\frac{1}{3}$  length of head ; longest soft rays  $\frac{1}{2}$  length of head. Anal III 8 ; third spine longest, a little longer and much stronger than longest dorsal. Pectoral  $\frac{3}{4}$  length of head, not quite reaching vertical of origin of anal. Ventral reaching a little beyond origin of anal. Caudal truncate. Caudal peduncle slightly longer than deep. Scales feebly denticulate,  $33 \frac{4}{14}$  ; lateral lines  $\frac{20-21}{13}$ . Dark brown, a little lighter

Fig. 215.

*Paratilapia parvidens.*

Type (Ann. Mus. Gen. 1911).  $\frac{5}{8}$ .

beneath ; a black opercular spot ; fins brown, soft dorsal and caudal with series of small round dark spots between the rays.

Total length 150 millim.

Victoria Nile.—Type in Genoa Museum.

#### 8. PARATILAPIA PFEFFERI.

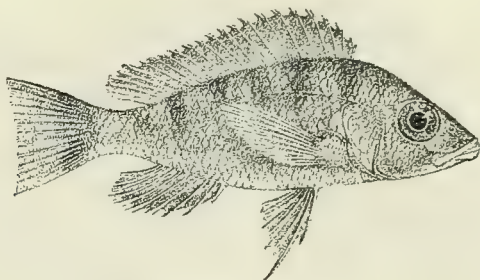
Bouleng. Tr. Zool. Soc. xv. 1898, p. 12, pl. iii. fig. 1, and Poiss. Bass. Congo, p. 421 (1901) ; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 258 ; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 563.

Depth of body equal to length of head,  $2\frac{2}{3}$  to 3 times in total length. Head  $2\frac{1}{3}$  to  $2\frac{1}{2}$  times as long as broad ; snout pointed, with straight upper profile, a little longer than broad, as long as postocular part of head ; eye  $3\frac{1}{3}$  times in length of head, equal to interorbital width, nearly twice least depth of præorbital ; mouth extending to below anterior border of eye ; præmaxillary processes very long, extending to between the eyes ; teeth small, in 3 series, outer larger in front, 44 to



54 in upper jaw; 3 or 4 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers rather long and slender, 11 on lower part of anterior arch. Dorsal XVI 8-10; spines equal from the sixth,  $\frac{2}{5}$  to nearly  $\frac{1}{2}$  length of head; longest soft rays  $\frac{1}{2}$  length of head. Anal III 7-8; third spine as long as longest dorsals. Pectoral  $\frac{4}{5}$  to  $\frac{5}{6}$  length of head, extending to vertical of origin of anal. Ventral reaching vent or anal. Caudal truncate or feebly emarginate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. Scales feebly denticulate,

Fig. 216.

*Paratilapia pfefferi.*

Type (Tr. Z. S. 1898).  $\frac{5}{6}$ .

32-33  $\frac{3-4}{9-10}$ ; lateral lines  $\frac{21-22}{10-14}$ . Olive above, silvery white beneath, with seven dark cross-bands; vertical fins greyish brown, spinous dorsal darker towards the edge.

Total length 76 millim.

Lake Tanganyika.

1. Type.	Kinyamkolo.	Prof. J. E. S. Moore (C.).
2-3. Ad.	Sumbu.	Dr. W. A. Cunningham (C.).

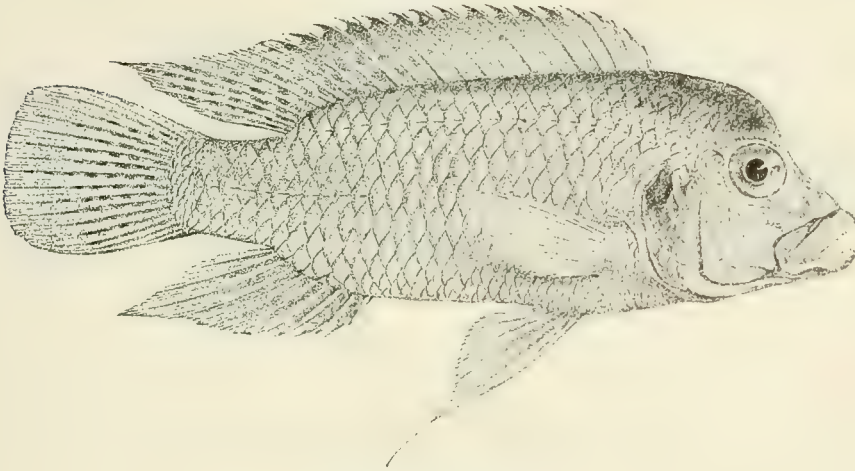
#### 9. PARATILAPIA DEMEUSIL.

Bouleng. Ann. Mus. Congo, Zool. i. p. 120, pl. xlv. fig. 3 (1899), and Poiss. Bass. Congo, p. 416 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 262.

Depth of body slightly greater than length of head, which is 3 times in total length. Head twice as long as broad, frontal region humped; snout rounded, with straight upper profile, as long as broad, as long as postocular part of head; eye  $3\frac{3}{4}$  times in length of head, equal to interorbital width, exceeding præorbital depth; mouth extending to below anterior fourth of eye; teeth small, in 3 series, about 60 in outer series of upper jaw; 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 9 on lower part of anterior

arch. Dorsal XV 10; spines equal from the fourth,  $\frac{2}{5}$  length of head; longest soft ray  $\frac{4}{5}$  length of head. Anal III 7; third spine a little shorter than longest dorsals. Pectoral a little more than  $\frac{2}{3}$  length of head, not extending to vertical of origin of anal. Ventral produced into a filament, reaching anal. Caudal rounded. Caudal peduncle as

Fig. 217.

*Paratilapia demeusii.*

Type (A. M. C.).

long as deep. Scales cycloid, or very indistinctly denticulate,  $28 \frac{3}{10}$ ; lateral lines  $\frac{19}{11}$ . Brown, lighter beneath; a black opercular spot; small black spots on the soft dorsal and caudal fins.

Total length 130 millim.

Upper Congo.

1. Type.

Bangala Country.

M. De Meuse (C.).

#### 10. PARATILAPIA AFRA.

*Hemichromis afer*, Günth. Proc. Zool. Soc. 1893, p. 626, pl. lvii. fig. B.

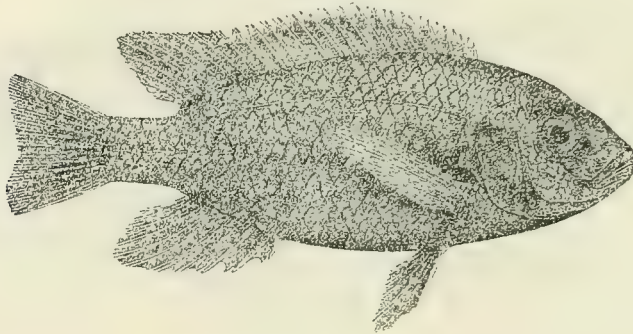
*Paratilapia afra*, Bouleng. Proc. Zool. Soc. 1898, p. 142; Pellegr. Mém. Soc.

Zool. France, xvi. 1904, p. 263.

Depth of body nearly equal to length of head, 3 times in total length. Head twice as long as broad, with curved upper profile; snout rounded, as long as broad, a little shorter than postocular part of head; eye  $3\frac{1}{2}$  times in length of head, equal to or slightly greater than inter-orbital width, exceeding præorbital depth; mouth not extending to below anterior border of eye; teeth in 3 series, outer rather large,

30 to 34 in upper jaw; 3 or 4 series of scales on the cheek, width of scaly part nearly equal to diameter of eye. Gill-rakers short, the largest T-shaped, 13 or 14 on lower part of anterior arch. Dorsal XVII 8; spines increasing in length to the last, which measures  $\frac{2}{5}$  length of head and about  $\frac{3}{5}$  longest soft rays. Anal III 6-7; third spine as long as longest dorsal. Pectoral  $\frac{3}{4}$  length of head, not

Fig. 218.

*Paratilapia afra.*

Type, after Günther (P. Z. S. 1893).

extending to vertical of origin of anal. Ventral reaching vent. Caudal rounded. Caudal peduncle slightly longer than deep. Scales finely denticulate, 29-32  $\frac{3}{10}$ ; lateral lines  $\frac{21-22}{9-12}$ . Dark brown; fins blackish.

Total length 93 millim.

Lake Nyassa.

1-2. Types.

L. Nyassa.

Rev. J. A. Williams (P.).

# 11. PARATILAPIA MODESTA.

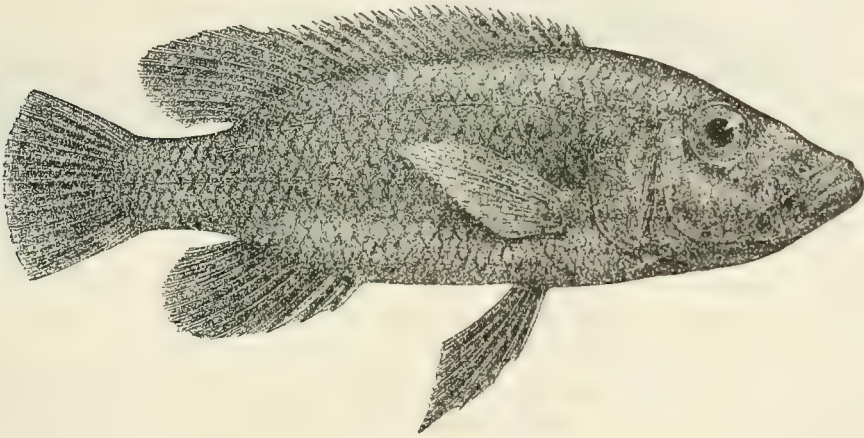
*Hemichromis modestus*, Günth. Proc. Zool. Soc. 1893, p. 625, pl. lvii. fig. A.

*Paratilapia modesta*, Bouleng. Proc. Zool. Soc. 1898, p. 144; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 264.

Depth of body equal to or a little less than length of head,  $2\frac{2}{3}$  to 3 times in total length. Head  $2\frac{1}{3}$  to  $2\frac{1}{2}$  times as long as broad, with straight or slightly concave upper profile; lower jaw projecting; snout rounded, longer than broad, as long as postocular part of head; eye 4 to  $4\frac{1}{2}$  times in length of head, equal to or a little less or a little more than interorbital width, nearly equal to præorbital depth; mouth extending to below anterior border of eye, or not quite so far; teeth in 3 or 4 series, outer largest, 60 to 70 in upper jaw; 3 or 4 series of

scales on the cheek, width of scaly part equal to or a little greater than diameter of eye. Gill-rakers short, 10 to 12 on lower part of anterior arch. Dorsal XVI 10-11; spines increasing in length to the last, which measures  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head. Anal III 8-9; third spine a little shorter than last dorsal. Pectoral  $\frac{2}{3}$  length of head, not extending

Fig. 219.

*Paratilapia modesta.*

Type, after Günther (P. Z. S. 1893).

to vertical of origin of anal. Ventral reaching origin of anal. Caudal rounded. Caudal peduncle slightly longer than deep. Scales finely denticulate, 32-34  $\frac{3\frac{1}{2}-4}{12-13}$ ; lateral lines  $\frac{21-24}{12-14}$ . Uniform dark brown, fins blackish.

Total length 200 millim.

Lake Nyassa and Upper Shiré River.

1. Type.	L. Nyassa.	Rev. J. A. Williams (P.).
2. Ad.	„	Prof. J. E. S. Moore (C.).
3-4. Ad.	Upper Shiré R.	Dr. Percy Rendall (C.); Sir H. H. Johnston (P.).

## 12. PARATILAPIA TODDI.

Bouleng. Ann. & Mag. N. H. (7) xvi. 1905, p. 642.

Depth of body equal to length of head,  $2\frac{2}{3}$  times in total length. Snout  $1\frac{1}{2}$  times length of eye, which is 4 times in length of head and a little exceeds interorbital width; mouth extending to below anterior border of eye; teeth small, in 3 or 4 series; 6 series of scales on the cheek. Gill-rakers short, the largest T-shaped, 13 on lower part of



anterior arch. Dorsal XVI 10; spines subequal in length,  $\frac{1}{3}$  length of head; longest soft rays not quite  $\frac{1}{2}$  length of head. Anal III 7. Pectoral  $\frac{2}{3}$  length of head. Ventral reaching origin of anal. Caudal rounded. Caudal peduncle a little deeper than long. Scales denticulate, 30  $\frac{3}{13}$ ; lateral lines  $\frac{20}{11}$ . Dark olive-brown above, whitish beneath; soft dorsal and caudal fins barred with blackish; a few ocellar dark spots on the anal fin.

Total length 150 millim.

Lusombo, Kasai River, Congo.—Type in Congo Museum, Tervueren.

### 13. PARATILAPIA THUMBERGII.

*Chromys thumbergi*, Casteln. Mém. Poiss. Afr. Austr. p. 13 (1861).

*Chromys ngamensis*, Casteln. l. c.

? *Chromys livingstonii*, Casteln. l. c.

*Hemichromis robustus*, Günth. Proc. Zool. Soc. 1864, p. 312.

*Hemichromis jallæ*, Bouleng. Boll. Mus. Torin. xi. 1896, no. 260.

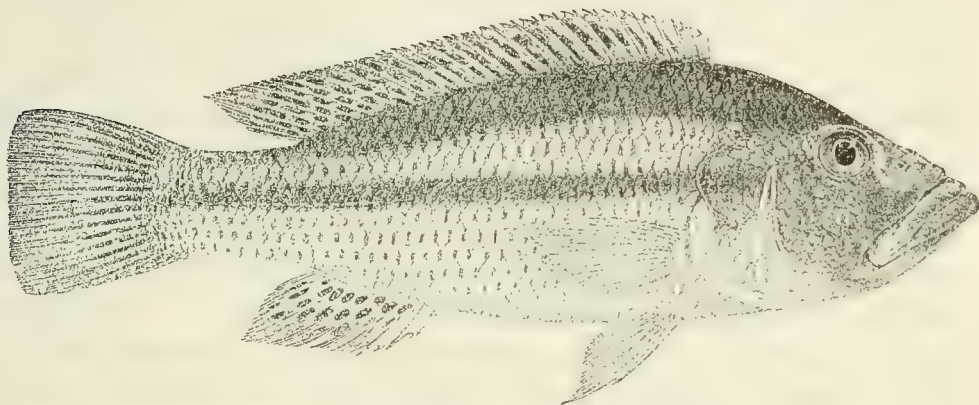
*Paratilapia robusta*, Bouleng. Proc. Zool. Soc. 1898, p. 141, and Poiss. Bass. Congo, p. 414 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 266.

*Paratilapia thumbergii*, Bouleng. Proc. Zool. Soc. 1898, p. 146; Pellegr. t. c. p. 268; Bouleng. Tr. Zool. Soc. xviii. 1911, p. 412, pl. xli.

Depth of body  $2\frac{4}{5}$  to  $3\frac{1}{4}$  times in total length, length of head  $2\frac{3}{5}$  to 3 times. Head 2 to  $2\frac{1}{4}$  times as long as broad, upper profile straight or slightly convex or slightly concave; lower jaw projecting; snout obtusely pointed, as long as broad, shorter than postocular part of head; eye  $4\frac{1}{2}$  (young) to 6 times in length of head, nearly equal to or a little less than interorbital width or præorbital depth; mouth extending to below anterior border of eye or a little beyond; teeth moderate, in 2 to 4 series, 48 (young) to 80 in outer series of upper jaw; 7 to 9 series of scales on the cheek, width of scaly part  $1\frac{1}{2}$  to 2 diameters of eye. Gill-rakers moderately long, some of the posterior usually bifid or trifid, 10 to 12 on lower part of anterior arch. Dorsal XV–XVIII 13–16; spines increasing in length to the last, which is  $\frac{1}{4}$  to  $\frac{2}{5}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{4}$  length of head. Anal III 10–12; third spine  $\frac{1}{4}$  to  $\frac{1}{3}$  length of head. Pectoral  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head, not extending to vertical of origin of anal. Ventral usually not reaching vent or anal. Caudal rounded or rounded-subtruncate. Caudal peduncle as long as deep or a little longer than deep. Scales feebly denticulate, sometimes cycloid, 35–41  $\frac{4\frac{1}{2}-5\frac{1}{2}}{12-15}$ ; lateral lines  $\frac{21-26}{14-18}$ . Dark

olive or brown above, yellowish beneath, sometimes with a reddish-brown spot at the base of each scale, often with two blackish longitudinal bands, the upper above the upper lateral line, the lower from the gill-cover to the base of the caudal fin; dorsal and caudal

Fig. 220.

*Paratilapia thumbergii.*Okovango R. (Tr. Z. S. 1911).  $\frac{2}{3}$ .

fins greyish or dark olive, with round blackish or reddish-brown spots; anal sometimes edged with yellow and with round red spots; ventrals often dark olive or blackish.

Total length 350 millim.

Lake Nyassa and Zambesi, Katanga, Lake Bangwelu, Angola, and Lake Ngami.—Type lost.

1. Skin, type of	L. Nyassa.	Sir J. Kirk (C.).
<i>H. robustus.</i>		
2-4. Ad. & hgr.	"	Prof. J. E. S. Moore (C.).
5-6. Ad.	"	Capt. E. L. Rhoades (P.).
7. Yg.	Between Kondowe and Karonga.	A. Whyte, Esq. (C.); Sir H. H. Johnston (P.).
8-12. Ad. & hgr.	Upper Shiré R.	Dr. Percy Rendall (C.); Sir H. H. Johnston (P.).
13. Skel.	"	" "
14. Ad.	Zambesi.	Dr. J. D. F. Gilchrist (P.).
15. Ad.	Kafue R., Zambesi.	"
16. Ad.	" "	T. Codrington, Esq. (P.).
17-19. Ad. & yg.	L. Bangwelu.	F. H. Melland, Esq., and Father Foulon (P.).
20. Skel.	"	" "

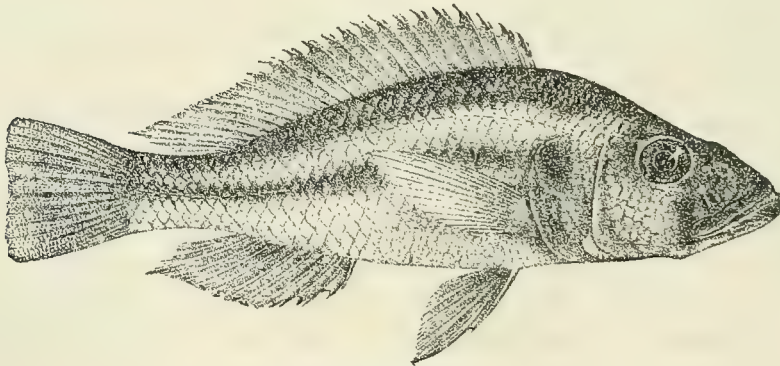
21-26. Ad. & yg.	L. Bangwelu.	F. H. Melland, Esq. (P.).
27. Yg.	Lofoi, Katanga.	Capt. Lemaire (C.).
28-31. Ad. & yg.	Okovango R., near L. Ngami.	R. B. Woosnam, Esq. (P.).
32-36. Hgr. & yg.	Mossamedes.	Dr. W. J. Ansorge (C.).
37. Yg.	Tala Kilau, Mossamedes.	"
38-42. Yg.	Dongwenna, "	"

## 14. PARATILAPIA VITTATA.

Bouleng. Ann. & Mag. N. H. (7) vii. 1901, p. 1, Poiss. Bass. Congo, p. 415 (1901), and Tr. Zool. Soc. xvi. 1901, p. 150, pl. xviii. fig. 1; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 263.

Depth of body 3 to  $3\frac{1}{4}$  times in total length, length of head  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times. Head  $2\frac{2}{3}$  to 3 times as long as broad, with curved upper profile; lower jaw projecting; snout longer than broad, a little shorter than postocular part of head,  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times length of eye, which is 4 to  $4\frac{3}{4}$  times in length of head, equals interorbital width, and a little exceeds præorbital depth; mouth extending to below anterior border of eye; teeth in 3 or 4 series, outer much larger than the others, about 50 in upper jaw; 3 or 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 10 to 12 on lower part of

Fig. 221.

*Paratilapia vittata.*

Type (Tr. Z. S. 1901).

anterior arch. Dorsal XV-XVI 8-9; spines subequal from the seventh or eighth, about  $\frac{1}{3}$  length of head and  $\frac{2}{3}$  longest soft rays. Anal III 8-9; third spine as long as longest dorsals. Pectoral about  $\frac{2}{3}$  length of head, not extending quite to vertical of origin of anal. Ventral reaching vent or origin of anal. Caudal truncate. Caudal peduncle



$1\frac{1}{2}$  times as long as deep. Scales finely denticulate,  $33-35 \frac{4}{11-12}$ ; lateral lines  $\frac{20-21}{10-13}$ . Olive above, whitish beneath; a blackish stripe on each side above the upper lateral line and another from the opercular spot to the root of the caudal fin; sometimes a blackish bar below the eye; dorsal, anal, and caudal fins greyish or blackish, ventrals black in the male.

Total length 120 millim.

Lake Kivu.

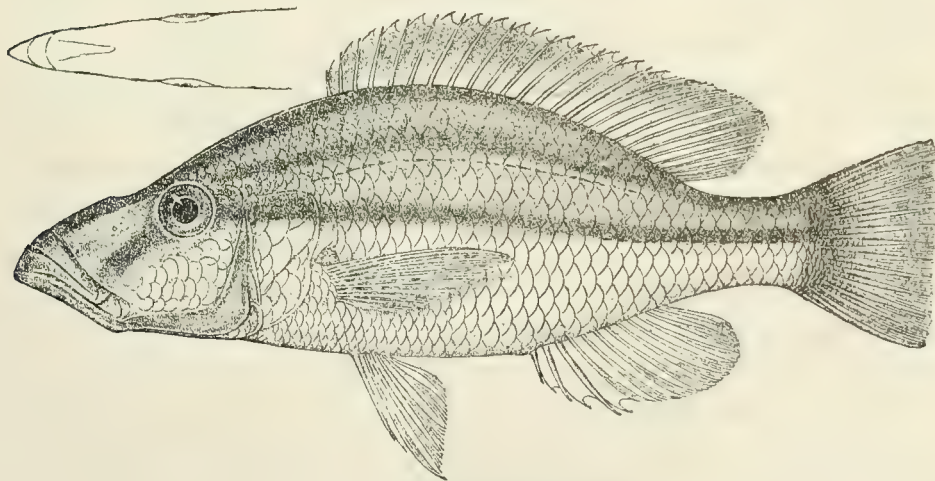
1-3. Types.	L. Kivu.	Prof. J. E. S. Moore (C.).
4. Skel.	"	"
5. Ad.	"	Dr. H. Schubotz (C.); German C. African Expedition.

#### 15. PARATILAPIA COMPRESSICEPS.

Bouleng. Ann. & Mag. N. H. (8) ii. 1908, p. 240.

Depth of body 3 times in total length, length of head  $2\frac{3}{5}$  times. Head 4 times as long as broad, with slightly concave upper profile; lower jaw projecting, chin pointed; snout twice as long as broad,

Fig. 222.



*Paratilapia compressiceps.*

Type.  $\frac{3}{4}$ .

longer than postocular part of head, a little over twice as long as eye, which is  $5\frac{1}{2}$  times in length of head, equals interorbital width, and  $\frac{2}{3}$  præorbital depth; mouth very oblique, widely separated from vertical of anterior border of eye; teeth in 3 series, outer large and widely



spaced, about 40 in upper jaw; 4 series of scales on the cheek, width of scaly part exceeding diameter of eye. Gill-rakers rather short, 10 on lower part of anterior arch. Dorsal XV 12; spines increasing in length to the last, which measures  $\frac{1}{3}$  length of head and  $\frac{4}{5}$  longest soft rays. Anal III 11; third spine as long as last dorsal. Pectoral  $\frac{2}{3}$  length of head, not extending quite to vertical of origin of anal. Ventral reaching vent. Caudal truncate. Caudal peduncle  $1\frac{1}{2}$  times as long as deep. Scales finely denticulate, 35  $\frac{4}{11}$ ; lateral lines  $\frac{22}{16}$ . Brownish above, silvery white beneath; three dark bands on each side, one along the upper outline of head and body, another above the upper lateral line, the third from the præorbital to the base of the caudal, passing through the eye; fins whitish.

Total length 165 millim.

Lake Nyassa.

1. Type.

L. Nyassa.

Capt. E. L. Rhoades (P.).

#### 16. PARATILAPIA LONGIROSTRIS.

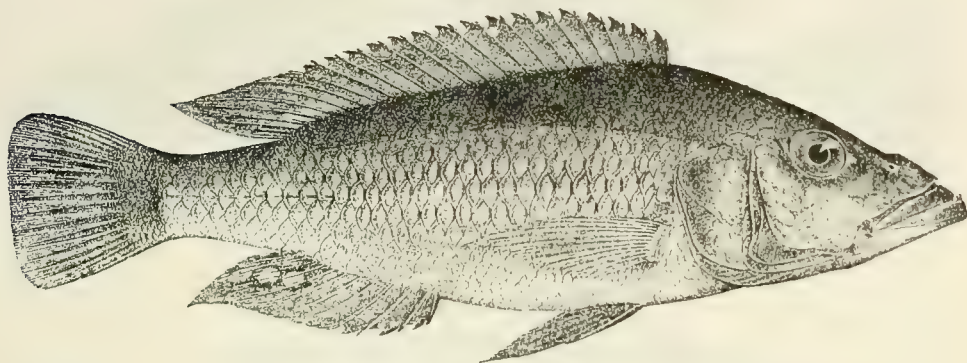
Hilgend. Sitzb. Ges. naturf. Fr. Berl. 1888, p. 77; Bouleng. Proc. Zool. Soc. 1898, p. 140; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 261; Bouleng. Fish. Nile, p. 467, pl. lxxxvi. fig. 2 (1907), and Ann. Mus. Genova, (3) v. 1911, p. 65.

*Hemichromis longirostris*, Pfeff. Thierw. O.-Afr., Fische, p. 20 (1896).

Depth of body 3 to  $4\frac{1}{5}$  times in total length, length of head  $2\frac{3}{5}$  to  $3\frac{1}{4}$  times. Head large,  $2\frac{1}{3}$  to 3 times as long as broad; lower jaw strongly projecting, the chin pointed; snout longer than broad, with straight or convex upper profile,  $1\frac{1}{5}$  (young) to 2 times as long as eye, which is 3 (young) to  $5\frac{1}{2}$  times in length of head, 1 to  $1\frac{1}{3}$  times in interorbital width, and about equal to præorbital depth; mouth not extending to below anterior border of eye; teeth, in the adult, in 4 or 5 series, the outer long, feebly curved, and rather far apart, the inner very small and either all unicuspid, or partly tricuspid; in the young, outer teeth bicuspid, inner tricuspid; 3 to 5 series of scales on the cheek, width of scaly part much exceeding diameter of eye. Gill-rakers short and stout, 8 to 11 on lower part of anterior arch. Dorsal XIV–XVI 9–10; spines increasing in length to the last, which measures  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; longest soft rays  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 8–10; third spine as long as or a little shorter than last dorsal. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not extending to vertical of origin of anal. Ventral reaching vent or origin of anal. Caudal rounded or subtruncate.

Caudal peduncle  $1\frac{1}{2}$  to 2 times as long as deep. Scales feebly denticulate, 33-40  $\frac{4-6}{12-14}$ ; lateral lines  $\frac{19-22}{7-14}$ . Olive to emerald-green above, silvery white beneath, with or without a blackish lateral band, or uniform dark brown; a small blackish opercular spot; dorsal and caudal fins grey to dark brown, sometimes with small round darker

Fig. 223.

*Paratilapia longirostris.*Bunjako (F. N.).  $\frac{2}{3}$ .

spots; ventral fin yellow in the female, black in the male; anal fin uniform yellow in the female, deep orange, with one to three large ocellar spots encircled with red, in the male.

Total length 230 millim.

Lake Victoria and Victoria Nile.—Type in Berlin Museum.

1-7, 8. Ad. & hgr.	Bunjako.	Mr. E. Degen (C.).
9-13. Ad. & yg.	Entebbe.	"
14. Skel.	"	"
15. Hgr.	Buganga.	"
16-17. Ad. & yg.	Sesse Ids.	Dr. E. Bayon (C.) ; Genoa Museum (P.).
18. Ad.	Jinja, Ripon Falls.	" "
19-20. Hgr. & yg.	Bululo, L. Kioga.	" "

#### 17. PARATILAPIA PROGNATHA.

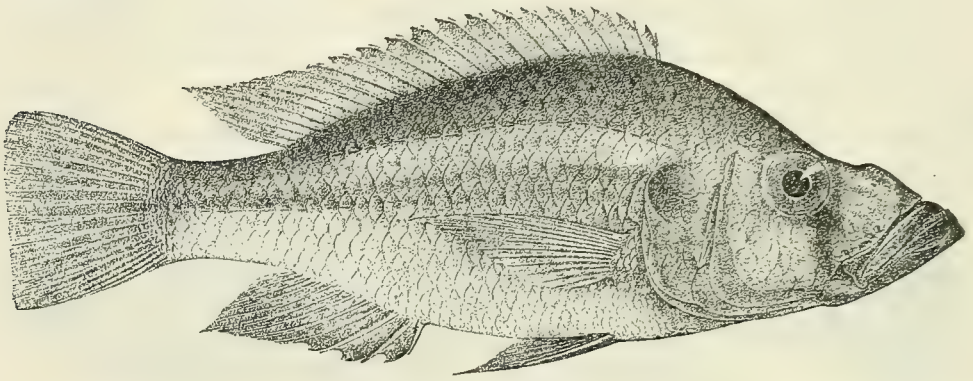
Pellegr. Mém. Soc. Zool. France, xvii. 1905, p. 181, pl. xvi. fig. 4; Bouleng. Fish. Nile, p. 469, pl. lxxxvi. fig. 3 (1907); Pellegr. Mém. Soc. Zool. France, xxii. 1910, p. 288; Bouleng. Ann. Mus. Genova, (3) v. 1911, p. 65.

*Paratilapia serranus*, part., Bouleng. Proc. Zool. Soc. 1901, ii. p. 161.

Intermediate between *P. serranus* and *P. longirostris*. Distinguished from the former by the strongly projecting lower jaw and pointed chin,

from the latter by the larger eye, the diameter of which is  $3\frac{1}{3}$  (young) to 5 times in length of head and equal, or nearly equal, to width of scaly

Fig. 224.

*Paratilapia prognatha.*

Type (F. N.).  $\frac{3}{4}$ .

part of cheek. Dorsal XIV-XVI 8-10. Scales 32-36  $\frac{4-5}{11-14}$ ; lateral lines  $\frac{19-21}{11-14}$ . Coloration similar to that of *P. serranus*, one or two dark lateral stripes being usually present.

Total length 170 millim.

Lake Victoria and Victoria Nile.—Types in Paris Museum.

1, 2. Two of the types.	Kavirondo Bay.	M. Alluaud (C.); Paris Museum (E.).
3-10. Ad., hgr., & yg.	Entebbe.	Mr. E. Degen (C.).
11-12. Ad.	Bunjako.	"
13-14. Ad.	L. Victoria.	Sir H. H. Johnston (P.).
15-16. Ad. & yg.	L. Salisbury.	Sir F. J. Jackson (P.).

#### 18. PARATILAPIA SERRANUS.

*Hemichromis serranus*, Pfeff. Thierw. O.-Afr., Fische, p. 23 (1896).

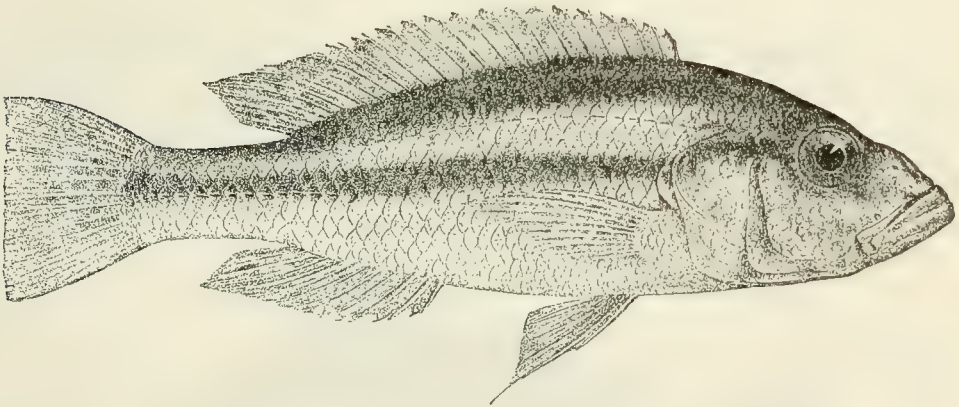
*Paratilapia serranus*, Bouleng. Proc. Zool. Soc. 1898, p. 143, and 1901, ii. p. 161 (part.); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 265; Bouleng. Fish. Nile, p. 471, pl. lxxxvii. fig. 1 (1907), and Ann. Mus. Genova, (3) v. 1911, p. 65.

Depth of body equal to or a little less than length of head,  $2\frac{9}{10}$  to 4 times in total length. Head  $2\frac{1}{5}$  to  $2\frac{1}{2}$  times as long as broad; lower jaw feebly projecting; snout as long as broad or a little longer than broad, with straight or convex upper profile, 1 (young) to  $1\frac{4}{5}$  times as long as eye, which is  $3\frac{1}{3}$  (young) to 5 times in length of head, 1 to  $1\frac{1}{2}$



times in interorbital width, and not less than depth of præorbital; mouth extending to below anterior border of eye; teeth in 4 to 6 series, the outer, in the adult, large, unicuspid, and curved, the others small and all unicuspid or tricuspid, or a part unicuspid and a part tricuspid; in the young, outer teeth bicuspid, inner tricuspid; 3 to 5 series of scales on the cheek, width of scaly part equal to or a little greater than diameter of eye. Gill-rakers short, largest more or less distinctly T- or anvil-shaped in the adult, 9 or 10 on lower part of anterior arch. Dorsal XV-XVII 8-10; spines increasing in length to the last, which measures about  $\frac{1}{3}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Anal III 8-10; third spine as long as or a little shorter than last dorsal in the adult, often a little longer in the young.

Fig. 225.



*Paratilapia serranus.*  
L. Victoria (F. N.).  $\frac{3}{4}$ .

Pectoral  $\frac{2}{3}$  to nearly once length of head, not extending to vertical of origin of anal. Ventral reaching vent or origin of anal in females, outer soft ray more or less produced in males. Caudal truncate, sometimes obliquely and with the lower angle rounded. Caudal peduncle  $1\frac{1}{2}$  to 2 times as long as deep. Scales feebly denticulate, 33-45  $\frac{4-6}{12-15}$ ; lateral lines  $\frac{19-23}{10-16}$ . Olive-brown above, yellowish white beneath; usually two more or less distinct brown or black bands on each side, sometimes broken up, the upper from the nape to the upper side of the caudal peduncle, the lower from the black opercular spot to the root of the caudal fin; a dark vertical bar may be present below the eye; young sometimes with ill-defined dark bars across the back; some males with the belly blackish; dorsal and caudal fins greyish, often with small round darker spots; ventral and anal grey or blackish in males, bright



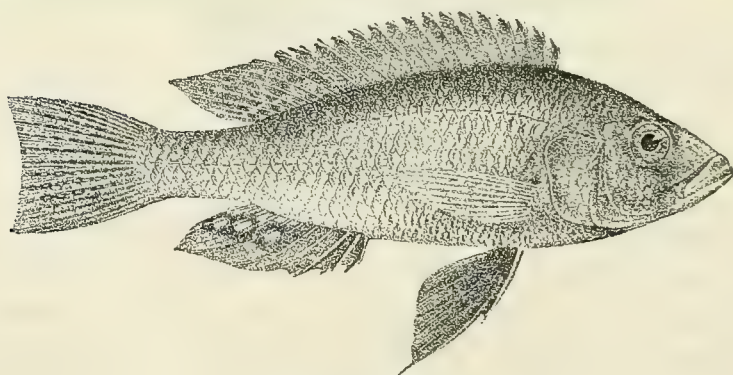
yellow in females; males usually with two or three yellow ocellar spots edged with red on the anal.

Total length 200 millim.

Lake Victoria and Victoria Nile, Lake Albert Edward.—Type in Hamburg Museum.

1-9, 10. Ad., hgr., & yg.	Bunjako.	Mr. E. Degen (C.).
11. Ad.	Buganga.	"
12-17, 18-27. Ad., hgr., & yg.	Entebbe.	"
28. Skel.	"	"
29-38. Ad., hgr., & yg.	Nsonga (Bussi).	"
39-40. Ad. & hgr.	Sesse Ids.	Dr. E. Bayon (C.); Genoa Museum (P.).
41. Yg.	Kisumu Bay, Kavi-rondo.	A. Blayney Percival, Esq. (P.).
42-45. Ad. & yg.	L. Victoria.	Sir H. H. Johnston (P.).
46-47. Ad. & yg.	"	Col. Delmé Radcliffe (P.).
48-50. Ad. & hgr.	Jinja, Ripon Falls.	Dr. E. Bayon (C.); Genoa Museum (P.).
50-52. Ad.	L. Albert Edward.	Dr. H. Schubotz (C.); German C. African Exped.

Fig. 226.



*Paratilapia guiarti*.  
Entebbe (F. N.).  $\frac{3}{5}$ .

#### 19. PARATILAPIA GUIARTI.

*Tilapia guiarti*, Pellegr. Mém. Soc. Zool. France, xvii. 1905, p. 184, pl. xvi. fig. 1.

*Paratilapia guiarti*, Bouleng. Fish. Nile, p. 473, pl. lxxxvii. fig. 2 (1907), and

Ann. Mus. Genova, (3) v. 1911, p. 67.

*Astatotilapia guiarti*, Pellegr. Mém. Soc. Zool. France, xxii. 1910, p. 290.

Very closely related to the preceding, but mouth not quite reaching to below anterior border of eye, and caudal fin truncate in the young, feebly but distinctly emarginate in the adult. Teeth of outer series bicuspid in the young, very rarely in the adult, unicuspid in the latter; the other teeth tricuspid. Coloration and sexual differences as in *P. serranus*, but dark longitudinal bands constantly absent.

Total length 200 millim.

Lake Victoria and Victoria Nile.—Type in Paris Museum.

1-16. Ad., hgr., & yg.	Entebbe.	Mr. E. Degen (C.).
17. Skel.	"	"
18-19. Ad. & hgr.	Sesse Ids.	Dr. E. Bayon (C.); Genoa Museum (P.).
20. Hgr.	Buddu Coast.	Mr. M. Simon (C.).
21. Hgr.	Kisuma Bay, Kavirondo.	A. Blayney Percival, Esq. (P.).
22. Ad.	L. Victoria.	Dr. E. Bayon (C.); Genoa Museum (P.).
23-24. Hgr. & yg.	Jinja, Ripon Falls.	" "

## 20. PARATILAPIA BAYONI.

Bouleng. Ann. Mus. Genova, (3) iv. 1909, p. 304, fig., and v. 1911, p. 65.

Depth of body equal to or a little less than length of head,  $2\frac{4}{5}$  to  $3\frac{1}{5}$  times in total length. Head  $2\frac{1}{3}$  to  $2\frac{3}{4}$  times as long as broad; lower jaw slightly projecting; snout longer than broad, with straight upper profile,  $1\frac{1}{5}$  (young) to 2 times as long as eye, which is  $3\frac{1}{3}$  (young) to 5 times in length of head, a little less than interorbital width, and equal to depth of præorbital; mouth not extending to below anterior border of eye; teeth in 3 or 4 series, inner very small, outer large and few, almost canine-like in the middle part of the jaws (bi- or tricuspid in the young); 4 series of scales on the cheek, width of scaly part equal to diameter of eye. 9 or 10 gill-rakers on lower part of anterior arch, some T-shaped. Dorsal XIV-XVI 9-10; spines rather feeble, increasing in length to the last, which measures  $\frac{2}{7}$  to  $\frac{2}{5}$  length of head; longest soft ray  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 9-10; third spine  $\frac{1}{4}$  to  $\frac{1}{3}$  length of head. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not reaching vertical of origin of anal. Ventral reaching origin of anal in the female, produced into a very long filament in the male. Caudal rounded-subtruncate. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times as long as deep. Scales

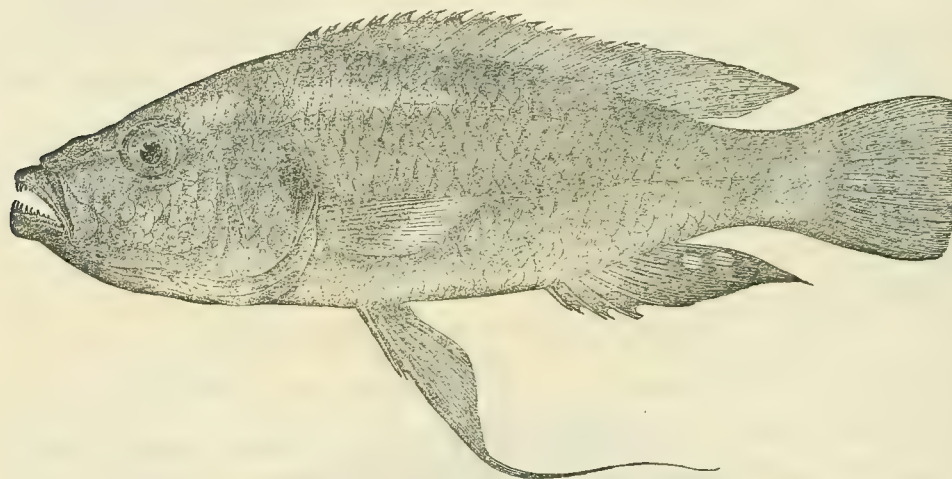
feebly denticulate, 31-34  $\frac{4-5}{10-12}$ ; lateral lines  $\frac{17-21}{10-14}$ . Brownish above, whitish beneath; a blackish opercular spot; soft dorsal and caudal with series of round dark spots between the rays; two bright ocellar spots on the anal in the male.

Total length 180 millim.

Lake Victoria and Victoria Nile.—Types in Genoa Museum.

- |                      |                   |  |
|----------------------|-------------------|--|
| 1. One of the types. | Sesse Ids.        | Dr. E. Bayon (C.);<br>Genoa Museum (P.). |
| 2-5. Hgr. & yg.      | Bululo, L. Kioga. | „ „                                      |

Fig. 227.



*Paratilapia bayoni.*

Type (Ann. Mus. Gen. 1909).  $\frac{5}{8}$ .

## 21. PARATILAPIA CHILOTES.

Bouleng. Ann. Mus. Genova, (3) v. 1911, p. 68, pl. ii. fig. 2.

Depth of body 3 times in total length, length of head  $2\frac{3}{5}$  times. Head  $2\frac{1}{2}$  times as long as broad; snout pointed, with straight or slightly convex upper profile,  $1\frac{1}{2}$  times as long as eye, which is 4 times in length of head, equals interorbital width, and exceeds least depth of præorbital; jaws equal in front; maxillary not extending to below anterior border of eye; lips very thick, both produced into a globular swelling projecting beyond the mouth; teeth very small, conical, 24 to 30 in outer row of upper jaw, followed by a few irregularly disposed minute teeth in the middle; 3 series of scales on the cheek, width

of scaly part less than diameter of eye. Gill-rakers short, 8 or 9 on lower part of anterior arch. Dorsal XVI–XVII 9; spines increasing in length to the last, which measures  $\frac{2}{3}$  length of head; longest soft rays nearly  $\frac{1}{2}$  length of head. Anal III 8–9; third spine longest, as long as last dorsal. Pectoral  $\frac{3}{4}$  length of head, nearly reaching vertical of origin of anal. Ventral reaching origin of anal. Caudal truncate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. Scales rather strongly denticulate, 31–32  $\frac{5}{12}$ ; lateral lines  $\frac{20-21}{11-13}$ . Brownish above, whitish beneath; six or seven dark transverse bars, crossed by a dark

Fig. 228.

*Paratilapia chilotes.*

Type (Ann. Mus. Gen. 1911).

longitudinal band extending from the eye to the caudal fin; fins brownish, anal with three round bright spots.

Total length 98 millim.

Victoria Nile at Ripon Falls.—Type in Genoa Museum.

1. One of the types. Jinja. Dr. E. Bayon (C.); Genoa Museum (P.).

## 22. PARATILAPIA PECTORALIS.

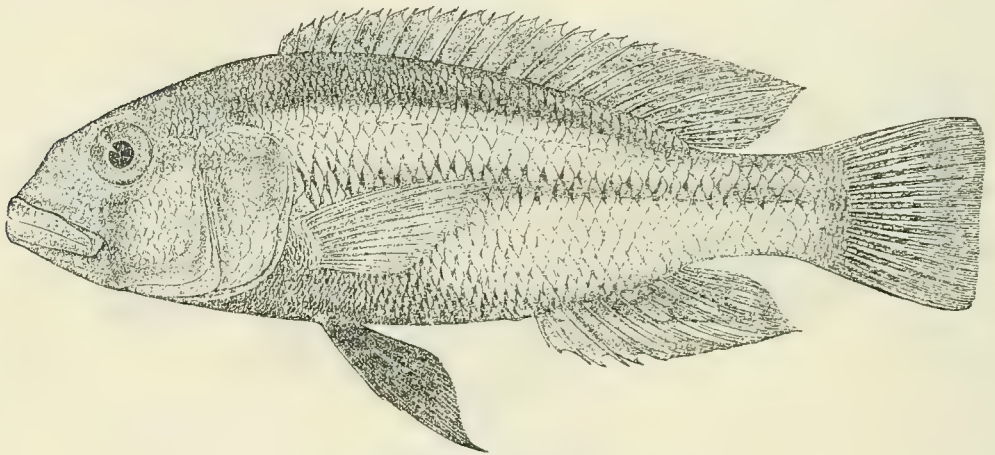
Bouleng. Ann. Mus. Genova, (3) v. 1911, p. 66, pl. i. fig. 2.

Depth of body a little less than length of head, 3 times in total length. Head twice as long as broad; snout with convex upper profile,  $1\frac{2}{5}$  diameters of eye, which is  $4\frac{1}{3}$  times in length of head,  $1\frac{1}{4}$  times in inter-orbital width, and equals least depth of præorbital; jaws equal in front;



maxillary extending to below anterior third of eye; teeth conical, in 3 series, of outer row rather large, the others very small; 6 or 7 series of scales on the cheek; the depth of the scaly part below the eye equal to diameter of latter. Gill-rakers rather short, 10 on lower part of anterior arch, some anvil-shaped. Dorsal XV 11; spines increasing in length to the last, which measures  $\frac{1}{3}$  length of head; longest soft rays a little over  $\frac{1}{2}$  length of head. Anal III 9; third spine longest, a little shorter but stronger than longest dorsal. Pectoral  $\frac{2}{3}$  length of head, not reaching vertical of origin of anal. Ventral reaching origin of anal. Caudal truncate. Caudal peduncle  $1\frac{1}{3}$  times as long as deep.

Fig. 229.

*Paratilapia pectoralis.*Type (Ann. Mus. Gen. 1911).  $\frac{2}{3}$ .

Scales feebly denticulate, very small on nape and on pectoral region,  $37\frac{7-8}{16}$ ; lateral lines  $\frac{25}{10}$ . Reddish brown above, lighter between two dark lateral bands, the lower of which is the better marked and extends from the opercular spot to above the lower lateral line; a rather ill-defined dark bar below the eye; gular and pectoral regions dark brown; pectorals whitish; ventrals black; the greater part of the anal bright yellow, with three large ocellar spots; dorsal and caudal brown, the latter with the lower corner yellow.

Total length 185 millim.

Victoria Nile at Ripon Falls.—Type in Genoa Museum.

## 23. PARATILAPIA MACULIPINNA.

Pellegr. Bull. Soc. Zool. France, xxxvii. 1913, p. 311.

Depth of body equal to length of head,  $2\frac{3}{4}$  times in total length. Snout as long as eye,  $3\frac{1}{2}$  times in length of head; lower jaw strongly projecting; mouth extending to below anterior border of eye; 3 series of conical teeth; 3 series of scales on the cheek. 10 gill-rakers on lower part of anterior arch. Dorsal XV 8; spines scarcely increasing in length after the sixth, last  $\frac{1}{3}$  length of head. Anal III 8; third spine stronger but not longer than last dorsal. Pectoral nearly as long as head, extending to vertical of origin of anal. Caudal rounded-subtruncate. Caudal peduncle  $1\frac{1}{3}$  times as long as deep. Scales denticulate,  $33\frac{6}{12}$ ; lateral lines  $\frac{19}{13}$ . Brown above, silvery beneath; 5 dark cross-bars, intersected by a longitudinal dark band on the posterior part of the body; two series of spots on the dorsal.

Total length 156 millim.

Lake Victoria.—Type in Paris Museum.

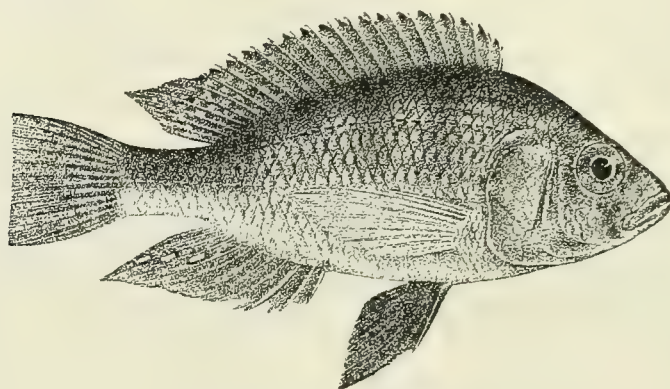
## 24. PARATILAPIA VICTORIANA.

Pellegr. Bull. Soc. Zool. France, 1903, p. 185, and Mém. Soc. Zool. France, xvii. 1905, p. 182, pl. xvi. fig. 3; Bouleng. Fish. Nile, p. 474, pl. lxxxvii. fig. 3 (1907); Pellegr. Mém. Soc. Zool. France, xxii. 1910, p. 290; Bouleng. Ann. Mus. Genova, (3) v. 1911, p. 67.

Depth of body equal or nearly equal to length of head,  $2\frac{1}{2}$  to 3 times in total length. Head 2 to  $2\frac{1}{4}$  times as long as broad; snout deeper than long, with straight or slightly convex upper profile, as long as or a little longer than eye, which is 3 (young) to 4 times in length of head, equals or nearly equals interorbital width, and exceeds præorbital depth; jaws equal in front, or lower feebly projecting, upper extending to below anterior border of eye; teeth small, in 4 or 5 series, outer largest and feebly curved, 40 to 50 in upper jaw, all unicuspid or some or all of the inner tricuspid; in the young, some of the outer teeth may bear a small lateral cusp; 4 series of scales on the cheek, width of scaly part equal to or less than diameter of eye. Gill-rakers short and stout, some anvil-shaped or bifid, 8 to 10 on lower part of anterior arch. Dorsal XV–XVI 9–10; five or six last spines equal in length,  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Anal III 8–9; third spine as long or nearly as long as longest dorsal. Pectoral as long as or a little shorter than head, extending beyond vertical of origin of

anal. Ventral reaching vent or anal. Caudal truncate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. Scales feebly denticulate, 33-40  $\frac{5-5\frac{1}{2}}{12-13}$ ; lateral lines  $\frac{20-22}{11-14}$ . Greyish or olive above, silvery white beneath; indistinct traces of darker cross-bands sometimes present; a feebly marked dark opercular spot; a dark bar sometimes present below the eye; dorsal and caudal fins grey, the soft part of the former and the upper half of the latter with round darker spots; ventrals and

Fig. 230.

*Paratilapia victoriana.*Bunjako (F. N.).  $\frac{6}{7}$ .

anal yellow in females; males with the ventral black and the anal red, the latter with two or three orange ocellar spots.

Total length 140 millim.

Lake Victoria and Victoria Nile.—Type in Paris Museum.

1-5. Ad.	Bunjako.	Mr. E. Degen (C.).
6-7. Ad.	Entebbe.	"
8-10. Ad. & hgr.	Sesse Ids.	Dr. E. Bayon (C.); Genoa Museum (P.).
11-13. Ad. & hgr.	Jinja, Ripon Falls.	" "

## 25. PARATILAPIA GRANTI.

*Haplochromis granti*, Bouleng. Ann. & Mag. N. H. (7) xvii. 1906, p. 446.

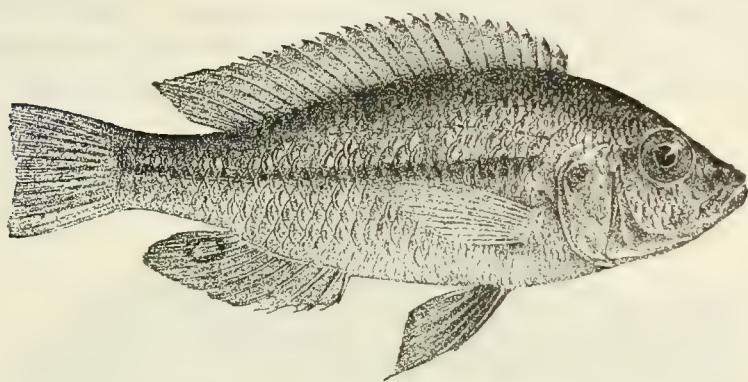
*Paratilapia granti*, Bouleng. Fishes Nile, p. 476, pl. lxxxvii. fig. 4 (1907).

Depth of body equal to or a little greater than length of head, which is  $2\frac{3}{4}$  to  $3\frac{1}{4}$  times in total length. Head about twice as long as broad, upper profile curved; snout broader and deeper than long, as long as eye, which is  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times in length of head, equals interorbital width and  $1\frac{1}{4}$  to  $1\frac{1}{2}$  times præorbital depth; mouth nearly horizontal or slightly oblique, extending to below anterior border of eye, or not quite



so far; teeth in 6 to 8 series, outer largest and numbering 30 to 50 in upper jaw, all conical or some of the smaller tricuspid in the adult, some of the outer flattened and more or less distinctly bicuspid in the young; 3 or 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 8 or 9 on lower part of anterior arch. Dorsal XV-XVII 8-9; spines equal in length from the seventh or eighth,  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head.

Fig. 231.

*Paratilapia granti.*

Type (F. N.).

Anal III 8-9; third spine stronger than dorsals,  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head. Pectoral as long as head or a little shorter, extending to vertical of origin of anal, or not quite so far. Ventral reaching origin of anal, or a little beyond. Caudal truncate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{2}{3}$  times as long as deep. Scales feebly denticulate, 30-35  $\frac{4-5}{12-13}$ ; lateral lines  $\frac{20-23}{9-13}$ . Pale olive-brown above, silvery white beneath; chin and throat bright yellow; a blackish opercular spot; a more or less distinct dark streak from the latter to the base of the caudal fin; sometimes a second dark streak higher up on the back; dorsal and caudal fins greyish, sometimes with small light spots between the rays; anal fin yellow, usually with one or two orange ocellar spots edged with red; ventral fins yellow, uniform or outer rays black or blackish.

Total length 145 millim.

Lake Victoria.

1-5. Types.	Banjako.	Mr. E. Degen (C.).
6. Skel.	"	"
7-8. Types.	Entebbe.	"
9. Type.	Buganga.	"

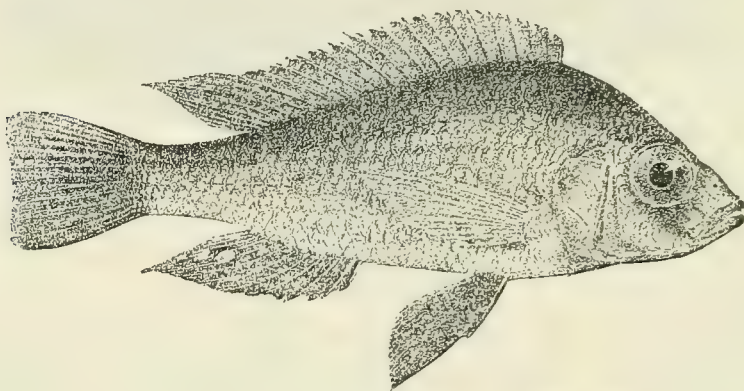


## 26. PARATILAPIA CINEREA.

Bouleng. Ann. & Mag. N. H. (7) xvii. 1906, p. 439, and Fish. Nile, p. 473, pl. lxxxvi. fig. 4 (1907).

Depth of body a little greater than length of head, 3 times in total length. Head  $2\frac{1}{3}$  times as long as broad; snout as long as broad, deeper than long, with steep oblique upper profile, a little shorter than eye, which is 3 times in length of head, equals interorbital width and twice præorbital depth; mouth slightly oblique, extending to below anterior border of eye; teeth small, in 4 series, outer largest and feebly curved, 44 in upper jaw, some of the inner more or less distinctly tricuspid; 3 series of scales on the cheek, width of scaly part  $\frac{2}{3}$  diameter

Fig. 232.

*Paratilapia cinerea.*

Type (F. N.).

of eye. Gill-rakers short, truncate, bi- or tricuspid, 9 on lower part of anterior arch. Dorsal XVI 8; spines increasing in length to the last, which measures  $\frac{2}{5}$  length of head; longest soft rays  $\frac{2}{3}$  length of head. Anal III 8; third spine a little shorter than last dorsal. Pectoral as long as head, extending a little beyond vertical of origin of anal. Ventral reaching a little beyond origin of anal. Caudal truncate. Caudal peduncle  $1\frac{2}{3}$  times as long as deep. Scales very feebly denticulate,  $33\frac{5}{13}$ ; lateral lines  $\frac{21}{11}$ . Grey above and beneath, darker on the back; a blackish opercular spot; fins dark grey, ventrals blackish; three large round orange spots, encircled with red, on the anal fin.

Total length 105 millim.

Lake Victoria.

1. Type.

Buganga.

Mr. E. Degen (C.).

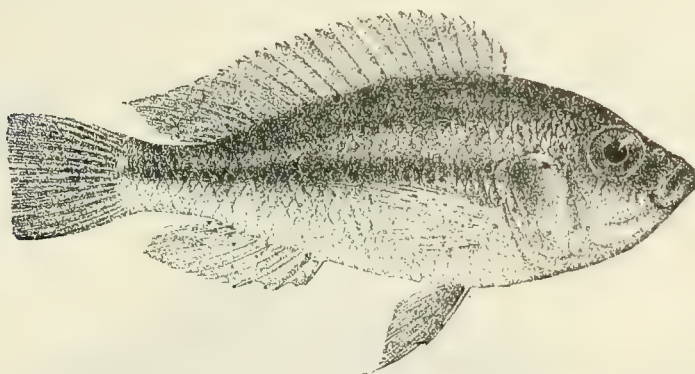
## 27. PARATILAPIA CRASSILABRIS.

*Haplochromis crassilabris*, Bouleng. Ann. & Mag. N. H. (7) xvii. 1906, p. 445.

*Paratilapia crassilabris*, Bouleng. Fish. Nile, p. 482, pl. lxxxvii. fig. 5 (1907), and Ann. Mus. Genova, (3) v. 1911, p. 68.

Depth of body equal to length of head,  $2\frac{4}{5}$  to 3 times in total length. Head about twice as long as broad; snout with convex upper profile, broader than long, as long as (young) or a little longer than diameter of eye, which is  $3\frac{1}{2}$  to 4 times in length of head, equals interorbital width, and exceeds præorbital depth; mouth not very oblique, with very thick lips, not extending to below anterior border of eye; teeth in 3 or 4 series, 20 to 34 in outer series of upper jaw, outer large and conical or

Fig. 233.

*Tilapia crassilabris*.Type (F. N.).  $\frac{7}{8}$ .

indistinctly bicuspid in the adult, bicuspid in the young, the others minute and conical or tricuspid; 3 series of scales on the cheek, width of scaly part equal to or a little less than diameter of eye. Gill-rakers short, 7 or 8 on lower part of anterior arch. Dorsal XV–XVI 8–9; spines increasing in length to the last, which measures  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head; longest soft rays about  $\frac{1}{2}$  length of head. Anal III 8–9; third spine stronger and usually a little shorter than last dorsal. Pectoral  $\frac{3}{4}$  to  $\frac{5}{6}$  length of head, extending to vertical of origin of anal. Ventral extending a little beyond origin of anal. Caudal truncate or rounded-subtruncate. Caudal peduncle  $1\frac{1}{4}$  to  $1\frac{1}{3}$  times as long as deep. Scales feebly denticulate, 31–33  $\frac{4}{13}$ ; lateral lines  $\frac{17-22}{10-12}$ . Brownish above, silvery white beneath; a rather indistinct dark bar across the nape, in front of the dorsal fin, and more or less distinct traces of two dark longitudinal

bands on the body in the adult; back with ill-defined dark cross-bands; fins greyish; caudal with small round darker spots, anal with or without small orange ocellar spots.

Total length 105 millim.

Lake Victoria and Victoria Nile.

1, 2-4, 5-10. Types.	Entebbe.	Mr. E. Degen (C.).
11-14. Ad. & hgr.	Sesse Ids.	Dr. E. Bayon (C.); Genoa Museum (P.).
15-16. Ad. & hgr.	Jinja, Ripon Falls.	" "
17. Skel.	" "	" "

## 28. PARATILAPIA BICOLOR.

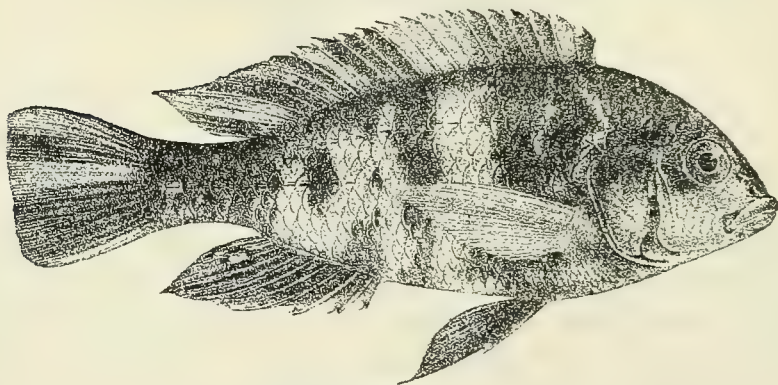
*Haplochromis bicolor*, Bouleng. Ann. & Mag. N. H. (7) xvii. 1906, p. 444.

*Paratilapia bicolor*, Bouleng. Fish. Nile, p. 479, pl. lxxxix. fig. 1 (1907), and Ann.

Mus. Genova, (3) v. 1911, p. 68.

Depth of body  $2\frac{3}{5}$  to 3 times in total length, length of head  $2\frac{4}{5}$  to  $3\frac{1}{5}$  times. Head about twice as long as broad, upper profile forming a strong curve; snout short, broader than long, as long as or slightly

Fig. 234.



*Paratilapia bicolor*.

Type (F. N.).  $\frac{7}{8}$ .

longer than the eye, which is  $3\frac{1}{2}$  to  $4\frac{1}{2}$  times in length of head, 1 to  $1\frac{1}{2}$  times in interorbital width, and exceeds præorbital depth; mouth not very oblique, with very thick lips, extending to below anterior border of eye, or not quite so far; teeth in 3 to 6 series, 30 to 50 in outer series of upper jaw, the outer large and mostly bicuspid in the young and obtusely conical in the adult, the others uni- or tricuspid; 3 or 4 series



of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short and stout, the larger T-shaped, 7 to 9 on lower part of anterior arch. Dorsal XV-XVI 8-10; spines subequal in length from the seventh or eighth, or increasing in length to the last, about  $\frac{2}{5}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Anal III 8-9; third spine as long as and stronger than longest dorsal. Pectoral as long as or a little shorter than head, extending to vertical of origin of anal. Ventral reaching vent or origin of anal. Caudal rounded-subtruncate, upper rays usually longer than lower. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. Scales feebly denticulate, 31-35  $\frac{5-6}{11-13}$ ; lateral lines  $\frac{18-25}{10-14}$ . Bright yellow, irregularly blotched or marbled with black, the black sometimes forming irregular cross-bands on the body; one or two pale yellow ocellar spots sometimes present on the anal fin.

Total length 155 millim.

Lake Victoria and Victoria Nile.

1-10. Types.	Bunjako.	Mr. E. Degen (C.).
11-14. Types.	Buganga.	"
15. Ad.	Sesse Ids.	Dr. E. Bayon (C.); Genoa Museum (P.).
16. Ad.	Jinja, Ripon Falls.	" "

## 29. PARATILAPIA RETRODENS.

Hilgend. Sitzb. Ges. nat. Fr. Berl. 1888, p. 76; Bouleng. Proc. Zool. Soc. 1898, p. 142; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 267; Bouleng. Fish. Nile, p. 480, pl. lxxxix. fig. 2 (1907), and Ann. Mus. Genova, (3) v. 1911, p. 67.

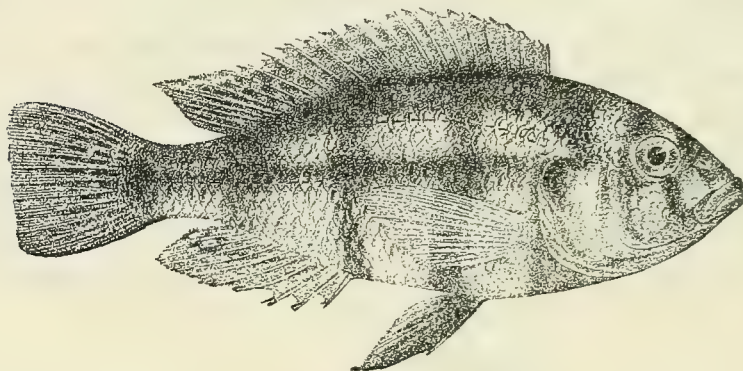
*Hemichromis retrodens*, Pfeff. Thierw. O.-Afr., Fische, p. 19 (1896).

Depth of body  $2\frac{1}{2}$  to 3 times in total length, length of head 3 to  $3\frac{1}{4}$  times. Head about twice as long as broad, upper profile convex, strongly curved; snout broader than long, as long as or a little longer than eye, which is  $3\frac{1}{2}$  to 4 times in length of head, a little less than interorbital width, and exceeds præorbital depth; mouth not very oblique, with very thick lips, extending to below anterior border of eye, or not quite so far; teeth in 6 to 8 series, 26 to 40 in outer row of upper jaw, outer large and conical in the adult, sometimes oblique on the sides, more or less distinctly bicuspid in the young, the others conical or tricuspid; 4 to 6 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short and stout, the larger bifid or T- or anvil-shaped, 8 or 9 on lower part of anterior arch.



Dorsal XV-XVI 9-10; spines increasing in length to the last, which measures  $\frac{2}{3}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{4}$  length of head. Anal III 9-10; third spine as long as or a little shorter than last dorsal. Pectoral as long as head or slightly shorter, extending to vertical of origin of anal, or a little beyond. Ventral reaching origin of anal, or a little beyond. Caudal rounded, upper rays usually the longer. Caudal peduncle  $1\frac{1}{4}$  to  $1\frac{1}{2}$  times as long as deep. Scales feebly denticulate, 34-40  $\frac{5-6}{13-15}$ ; lateral lines  $\frac{20-21}{7-14}$ . Coloration very variable, yellow, brownish or olive, with or without dark cross-bands, which may be

Fig. 235.



*Paratilapia retrodens*.  
Bunjako (F. N.).

intersected by three dark longitudinal bands; often two black bars across the snout, a third across the posterior part of the interorbital region, and a fourth from below the anterior third of the eye to the angle of the mouth; a dark opercular spot usually present; anal sometimes with two or three bright ocellar spots.

Total length 165 millim.

Lake Victoria and Victoria Nile.—Type in Berlin Museum.

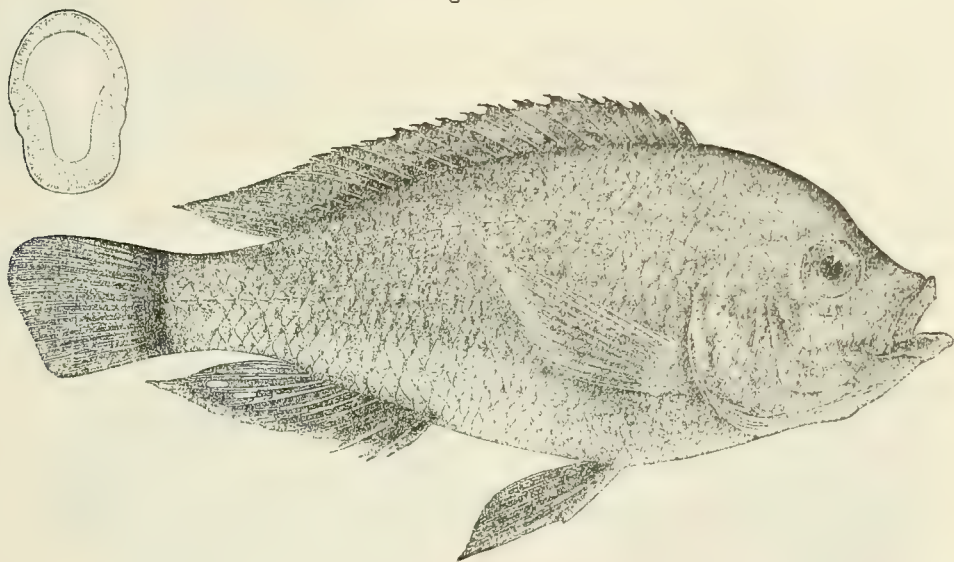
1-6. Ad. & hgr.	Bunjako.	Mr. E. Degen (C.).
7-9. Ad. & hgr.	Entebbe.	"
10. Ad.	Sesse Ids.	Dr. E. Bayon (C.); Genoa Museum (P.).
11-12. Ad. & hgr.	Jinja, Ripon Falls.	" "
13. Skel.	" "	" "

## 30. PARATILAPIA POLYODON.

Bouleng. Ann. Mus. Genova, (3) iv. 1909, p. 306, fig., and v. 1911, p. 68.

Depth of body  $2\frac{1}{2}$  times in total length, length of head 3 times. Head nearly twice as long as broad; snout with concave upper profile, broader than long, slightly longer than eye, which is 4 times in length of head,  $1\frac{1}{4}$  times in interorbital width, and exceeds præorbital depth; mouth oblique, with thick lips, extending to below anterior border of

Fig. 236.

*Paratilapia polyodon.*

Type (Ann. Mus. Gen. 1909).  $\frac{2}{3}$ .

eye or a little beyond; teeth forming broad villiform bands, in 7 to 10 series; outer teeth larger but very small, 56 to 70 in upper jaw; 3 or 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 8 or 9 on lower part of anterior arch. Dorsal XVI 9; spines increasing in length to the last, which measures  $\frac{2}{5}$  length of head; longest soft rays  $\frac{1}{2}$  length of head. Anal III 8-9; third spine  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head. Pectoral as long as or slightly shorter than head, extending to vertical of origin of anal. Ventral reaching vent. Caudal truncate or rounded, upper rays the longer. Caudal peduncle slightly longer than deep. Scales feebly denticulate, 32-35  $\frac{5-6}{15-16}$ ; lateral lines  $\frac{20-22}{8-13}$ . Olive-brown, darker above; pectorals and anal yellowish;

ventrals black in males; two bright ocellar spots may be present on the anal.

Total length 170 millim.

Lake Victoria and Victoria Nile.—Type in Genoa Museum.

- |                      |                     |                    |
|----------------------|---------------------|--------------------|
| 1. One of the types. | Sesse Ids.          | Dr. E. Bayon (C.); |
|                      |                     | Genoa Museum (P.). |
| 2. Ad.               | Jinja, Ripon Falls. | " "                |

### 31. PARATILAPIA DORSALIS.

Pellegr. Bull. Mus. Paris, 1902, p. 419, and Mém. Soc. Zool. France, xvi. 1904, p. 259, pl. v. fig. 4.

Depth of body  $2\frac{1}{2}$  times in total length, length of head 2 times. Head with straight upper profile; snout a little shorter than eye, which is 3 times in length of head and exceeds interorbital width and præorbital depth; mouth not extending to below anterior border of eye; teeth in 3 or 4 series; 3 series of scales on the cheek, width of scaly part less than diameter of eye. 7 gill-rakers on lower part of anterior arch. Dorsal XIV 10; spines subequal from the fourth, which measures  $\frac{1}{2}$  length of head. Anal III 8; third spine stronger but shorter than longest dorsal. Pectoral nearly as long as head, extending to vertical of origin of anal. Caudal —? Caudal peduncle as long as deep. Scales cycloid,  $27\frac{3}{10}$ ; lateral lines  $\frac{19}{7}$ . Yellowish brown; a dark opercular spot; fins greyish, dorsal with light dots.

Total length 80 millim.

Upper Congo (Brazzaville).—Type in Paris Museum.

### 32. PARATILAPIA LUEBBERTI.

Hilgend. Sitzb. Ges. nat. Fr. Berl. 1902, p. 141; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 261.

Depth of body nearly equal to length of head,  $2\frac{1}{2}$  times in total length. Head with straight upper profile; eye  $3\frac{2}{3}$  times in length of head, equal to interorbital width; mouth extending to below anterior border of eye, or not quite so far; teeth in 3 series; 4 series of scales on the cheek. Gill-rakers broad and short, 9 on lower part of anterior arch. Dorsal XV 10; last spine longest,  $\frac{1}{3}$  length of head; longest soft ray about  $\frac{2}{3}$  length of head. Anal III 9. Pectoral hardly  $\frac{2}{3}$  length of head. Ventral hardly reaching vent. Caudal rounded. Caudal peduncle nearly as long as deep. Scales cycloid, 26–27  $\frac{2\frac{1}{2}}{11}$ ;



lateral lines  $\frac{27}{9-12}$ . Bronze-brown, with an indistinct darker band along each of the lateral lines; a dark spot at the base of the caudal; an ill-defined dark bar from the eye to the angle of the mouth; a bluish-black opercular spot; a few dark dots on the soft dorsal and at the base of the anal and caudal; ventrals dark with light edge.

Total length 100 millim.

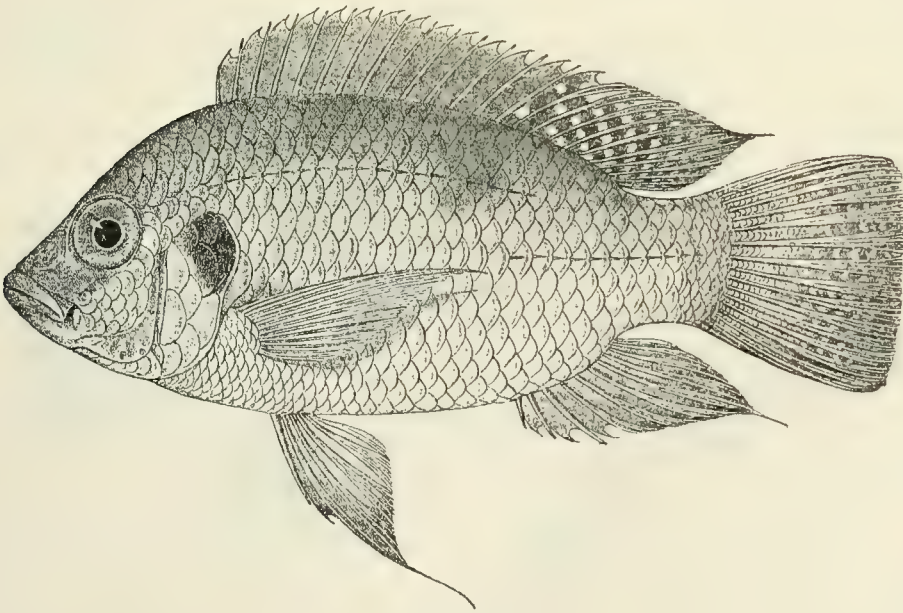
German South-West Africa.—Types in Berlin Museum.

### 33. PARATILAPIA CORBALI.

Bouleng. Ann. & Mag. N. H. (8) xii. 1913, p. 483.

Depth of body  $2\frac{1}{4}$  to  $2\frac{1}{3}$  times in total length, length of head  $2\frac{3}{4}$  times. Head twice as long as broad, with steep, nearly straight upper profile; snout rounded, as long as broad or a little broader than long,

Fig. 237.



*Paratilapia corbali*.

Type.  $\frac{5}{6}$ .

shorter than postocular part of head; eye as long as snout,  $3\frac{1}{3}$  times in length of head, equal to interorbital width and exceeding præorbital depth; mouth extending to below anterior border of eye; teeth rather small, in 5 or 6 series, 50 to 56 in outer series of upper jaw; 4 series of scales on the cheek, width of scaly part equal to or a little less than



diameter of eye. Gill-rakers short, the largest bifid, 9 on lower part of anterior arch. Dorsal XIV 11-12; spines equal from the eighth, a little less than  $\frac{1}{2}$  length of head; longest soft rays  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Anal III 8; third spine  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head. Pectoral as long as or a little longer than head, extending to vertical of origin of anal. Ventral produced into a long filament, extending beyond origin of anal. Caudal truncate. Caudal peduncle much deeper than long. Scales cycloid, 29  $\frac{2\frac{1}{2}-3}{10}$ ; lateral lines  $\frac{18-19}{11-12}$ . Brownish, young with five indistinct darker cross-bars, and a large dark brown blotch below the last rays of the spinous dorsal; a black opercular spot; small light spots on the dorsal and caudal.

Total length 150 millim.

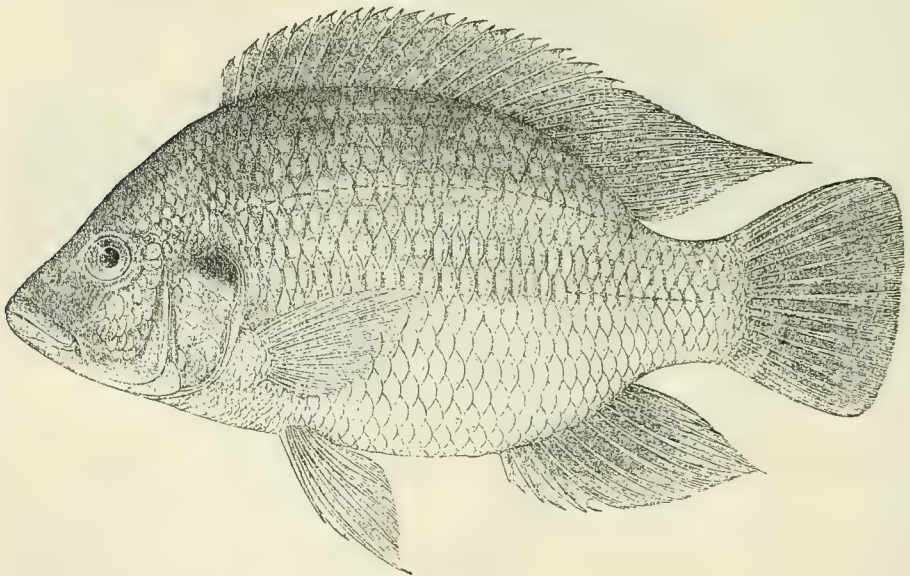
Portuguese Guinea.

1-2. Types.

Corbal River at Chitole.

Dr. W. J. Ansorge (C.).

Fig. 238.



*Paratilapia codringtoni*.

Type.  $\frac{1}{2}$ .

#### 34. PARATILAPIA CODRINGTONI.

Bouleng. Ann. & Mag. N. H. (8) ii. 1908, p. 495.

Depth of body twice, or a little less than twice, in total length, length of head 3 to  $3\frac{1}{5}$  times. Head twice as long as broad, with steep, straight or slightly concave upper profile; snout rounded. as long as

broad, shorter than postocular part of head; eye 5 times in length of head,  $\frac{2}{3}$  interorbital width and a little less than præorbital depth; mouth not extending to below anterior border of eye, maxillary slipping nearly entirely under the præorbital; teeth small, in 3 series, 50 to 60 in outer series of upper jaw; 4 or 5 series of scales on the cheek, width of scaly part much greater than diameter of eye. Lower pharyngeal teeth with spherical crowns. Gill-rakers short, 11 or 12 on lower part of anterior arch. Dorsal XV 14-15; spines increasing in length to the last, which measures  $\frac{1}{2}$  or a little more than  $\frac{1}{2}$  length of head; longest soft rays as long as head. Anal III 10; third spine shorter than last dorsal. Pectoral  $\frac{3}{4}$  length of head, not extending to vertical of origin of anal. Ventral reaching vent. Caudal rounded. Caudal peduncle much deeper than long. Scales cycloid, 35-36  $\frac{4}{12}$ ; lateral lines  $\frac{21-24}{14-16}$ . Brownish, darker on the back, the scales lighter in the centre; a black opercular spot; dorsal purplish, edged with orange; ventrals purplish; anal and caudal orange.

Total length 300 millim.

Zambesi.

1-2. Types.	Zambesi above Victoria Falls.	T. Codrington, Esq. (P.).
3. Skel.	" "	" "

### 35. PARATILAPIA CARLOTTÆ.

Bouleng. Ann. S. Afr. Mus. iii. 1905, p. 301, pl. xiv.

Depth of body  $2\frac{1}{3}$  to  $2\frac{2}{3}$  times in total length, length of head 3 or  $3\frac{1}{5}$  times. Head twice as long as broad; snout rounded, with straight or slightly concave upper profile, as long as broad, shorter than postocular part of head,  $1\frac{1}{3}$  times as long as eye, which is 4 or  $4\frac{1}{5}$  times in length of head, 1 to  $1\frac{1}{2}$  times in interorbital width, and equals depth of præorbital; mouth not extending to below anterior border of eye; teeth small, in 4 series, about 40 in outer series of upper jaw; 4 series of scales on the cheek, width of scaly part equal to or greater than diameter of eye. Lower pharyngeal teeth with spherical crowns. Gill-rakers short, the largest T-shaped, 11 or 12 on lower part of anterior arch. Dorsal XV 12-13; spines increasing in length to the last, which measures nearly  $\frac{2}{5}$  length of head and  $\frac{1}{2}$  to  $\frac{2}{3}$  longest soft rays. Anal III 9-10; third spine a little shorter than last dorsal. Pectoral shorter than head, not extending to vertical of origin of anal. Ventral reaching origin of anal or a little beyond. Caudal rounded. Caudal peduncle

as long as deep or slightly deeper than long. Scales finely denticulate, 33-34  $\frac{4}{11}$ ; lateral lines  $\frac{22-23}{14-17}$ . Dark brown above, white beneath; a black opercular spot; vertical fins with round black spots; paired fins whitish, ventrals black in the males.

Total length 255 millim.

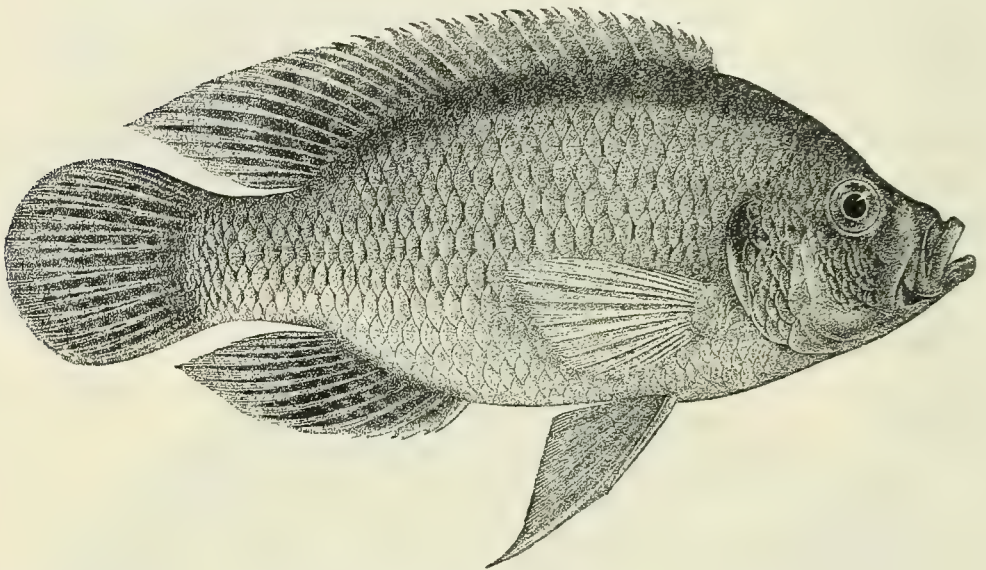
Zambesi near Victoria Falls.—Type in S. African Museum.

1-2. Ad.

Kafue R.

Dr. J. D. F. Gilchrist (P.).

Fig. 239.



*Paratilapia carlottæ.*

Type (Ann. S. Afr. Mus. 1905).  $\frac{1}{2}$ .

### 36. PARATILAPIA GIBBICEPS.

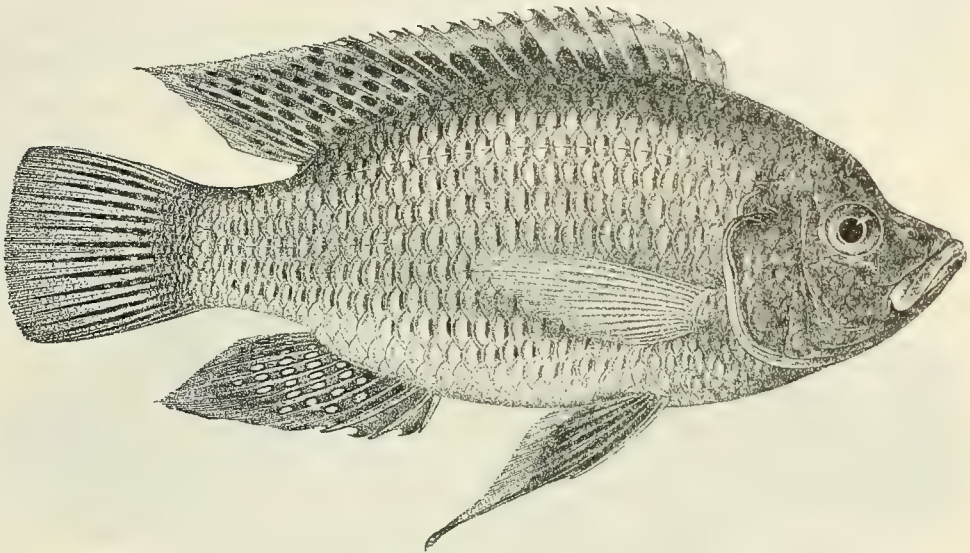
Bouleng. Tr. Zool. Soc. xviii. 1911, p. 411, pl. xliii. fig. 1.

Depth of body  $2\frac{1}{4}$  times in total length, length of head  $3\frac{1}{6}$  to  $3\frac{1}{5}$  times. Head nearly twice as long as broad, upper profile very convex above the eye; snout rounded, a little broader than long, shorter than postocular part of head; eye  $4\frac{1}{3}$  to  $4\frac{1}{2}$  times in length of head,  $1\frac{1}{4}$  times in interorbital width, equal to præorbital depth; mouth extending to below anterior border of eye; teeth in outer series rather small, about 60 in upper jaw, followed by 2 series of minute teeth; 4 series of scales on the cheek, width of scaly part a little greater than diameter of eye. Lower pharyngeal teeth with spherical crowns. Gill-rakers short, posterior T-shaped, 10 or 11 on lower part of anterior arch. Dorsal



XV 12-13; spines increasing in length to the last, which is  $\frac{1}{2}$  length of head; longest soft rays nearly as long as head. Anal III 10; third spine  $\frac{2}{3}$  length of head. Pectoral as long as head, reaching vertical of origin of anal. Ventral reaching beyond origin of anal. Caudal rounded. Caudal peduncle as long as deep or a little deeper than long. Scales cycloid, 31-33  $\frac{3\frac{1}{2}}{11}$ ; lateral lines  $\frac{21-23}{12-14}$ . Olive above, pale green beneath, with a purplish-brown bar at the base of the scales; pectorals

Fig. 240.



*Paratilapia gibbiceps.*  
Type (Tr. Z. S. 1911).  $\frac{5}{8}$ .

pale olive, ventrals dark olive; dorsal, anal, and caudal greyish; dorsal edged with red, the soft part with regular series of round purplish-brown spots; similar spots on the caudal; anal with round pink spots.

Total length 200 millim.

Lake Ngami Basin.

1-2. Types.

Okovango R.

R. B. Woosnam, Esq. (C.).

### 37. PARATILAPIA FREDERICI.

*Chromys frederici*, Casteln. Mém. Poiss. Afr. Austr. p. 15 (1861).

*Chromidotilapia* (?) *frederici*, Bouleng. Proc. Zool. Soc. 1898, p. 151.

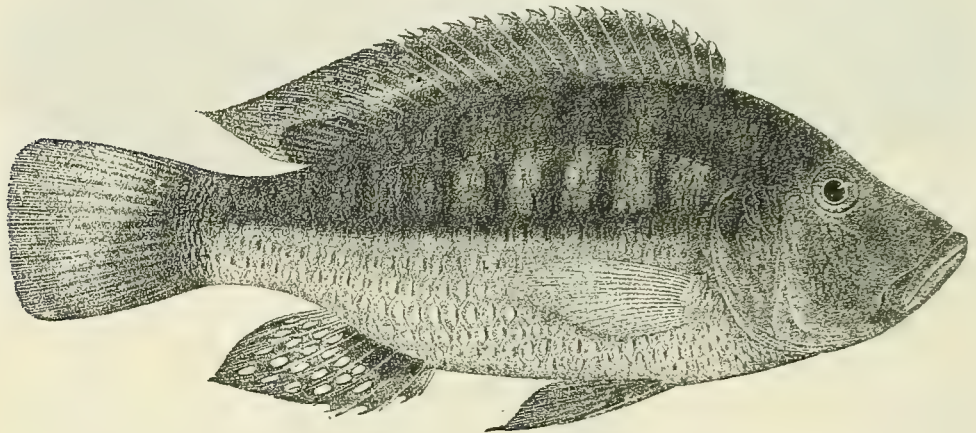
*Paratilapia frederici*, Bouleng. Tr. Zool. Soc. xviii. 1911, p. 409, pl. xxxix. fig. 1.

Depth of body  $2\frac{1}{2}$  times in total length, length of head 3 times. Head twice, or a little over twice, as long as broad, upper profile slightly



concave in front of the eyes; snout rounded, as long as broad, as long as or slightly longer than postocular part of head; eye  $5$  to  $5\frac{1}{2}$  times in length of head,  $1\frac{1}{5}$  to  $1\frac{1}{4}$  times in interorbital width, less than præorbital depth; mouth not extending to below anterior border of eye; teeth in outer series rather small, 50 to 60 in upper jaw, followed by one or two irregular series of minute teeth confined to the anterior part of the jaws; 3 to 5 series of scales on the cheek, width of scaly part greater than diameter of eye. Lower pharyngeal teeth with spherical crowns. Gill-rakers short, knob-like or anvil-shaped, 11 or 12 on lower part of anterior arch. Dorsal XV 13-14; spines increasing in length to the last, which is about  $\frac{2}{5}$  length of head; longest soft rays  $\frac{3}{5}$  to  $\frac{3}{4}$  length of head. Anal III 8-9; third spine  $\frac{1}{3}$  length of head. Pectoral  $\frac{3}{4}$  to  $\frac{4}{5}$

Fig. 241.

*Paratilapia frederici.*Okovango R. (Tr. Z. S. 1911).  $\frac{5}{8}$ .

length of head, not reaching vertical of origin of anal. Ventral reaching vent. Caudal rounded. Caudal peduncle as long as deep. Scales cycloid, 32-34  $\frac{3\frac{1}{2}}{11}$ ; lateral lines  $\frac{21-23}{14-15}$ . Olive above, paler beneath, with or without a vertical brown bar at the base of each scale; sometimes with a blackish lateral band, which may be traversed by eight blackish vertical bars; dorsal green or olive, sometimes edged with red, with round yellowish-brown spots on the soft part; anal green or pink, with numerous round pinkish-white spots; pectorals lake-red, ventrals olive-green.

Total length 210 millim.

Lake Ngami Basin.—Type lost.

1-3. Ad.

Okovango R.

R. B. Woosnam, Esq. (C.).

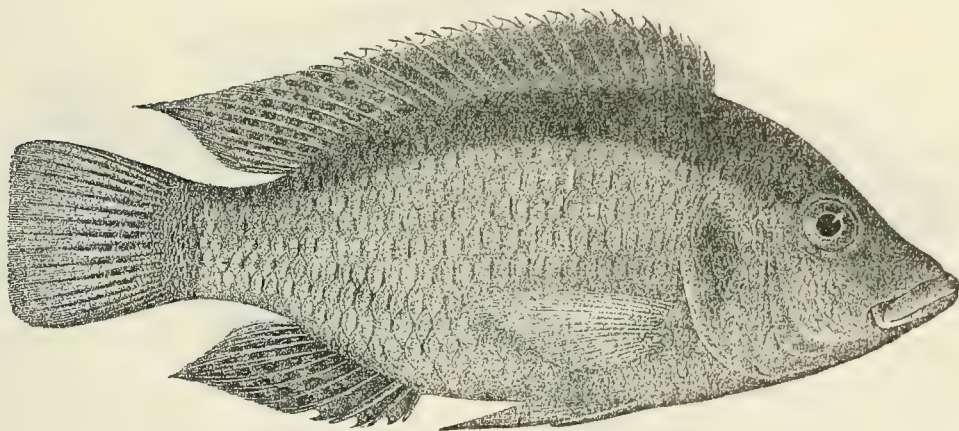
## 38. PARATILAPIA SMITHII.

? *Chromys smithii*, Casteln. Mém. Poiss. Afr. Austr. p. 16 (1861).

*Paratilapia smithii*, Bouleng. Tr. Zool. Soc. xviii. 1911, p. 410, pl. xxxix. fig. 2.

Depth of body  $2\frac{1}{3}$  to  $2\frac{1}{2}$  times in total length, length of head 3 times. Head twice as long as broad, upper profile slightly concave in front of eyes; snout rounded, as long as broad, as long as postocular part of head; eye 4 to  $4\frac{1}{2}$  times in length of head,  $1\frac{1}{5}$  to  $1\frac{1}{4}$  times in inter-orbital width, equal to præorbital depth; mouth not extending to below anterior border of eye; teeth in outer series rather small, 52 to 64 in upper jaw, followed by one or two series of minute teeth; 5 series of scales on the cheek, width of scaly part greater than diameter of eye.

Fig. 242.

*Paratilapia smithii*.

Okovango R. (Tr. Z. S. 1911).  $\frac{5}{8}$ .

Lower pharyngeal teeth with spherical crowns. Gill-rakers short, knob-like, 9 to 12 on lower part of anterior arch. Dorsal XIV–XV 12–13; spines increasing in length to the last, which is about  $\frac{2}{5}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Anal III 8–9; third spine about  $\frac{1}{3}$  length of head. Pectoral  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head, not extending to vertical of origin of anal. Ventral reaching vent or anal, or not so far. Caudal rounded-subtruncate. Caudal peduncle as long as deep or a little deeper than long. Scales cycloid or indistinctly denticulate, 33–34  $\frac{3\frac{1}{2}}{10-11}$ ; lateral lines  $\frac{21-23}{13-15}$ . Brown to blackish above, yellowish or dark grey beneath; vertical fins olive-grey or dark brown, with round

dark or ocellar spots forming single series between the rays; pectorals greyish olive; ventrals greyish olive or blackish.

Total length 220 millim.

Lake Ngami Basin.—Type lost.

1-3. Ad.

Okovango R.

R. B. Woosnam, Esq. (C.).

4. 5. Skel.

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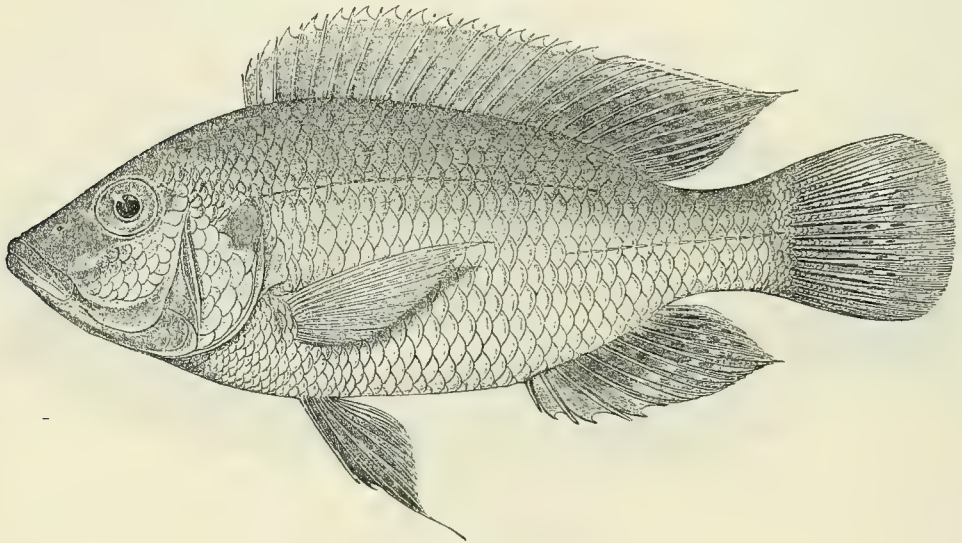
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### 39. PARATILAPIA MELLANDI.

Bouleng. Ann. & Mag. N. H. (7) xvi. 1905, p. 646.

Depth of body  $2\frac{1}{3}$  to  $2\frac{2}{3}$  times in total length, length of head 3 times. Head a little over twice as long as broad; snout obtusely pointed, with

Fig. 243.



*Paratilapia mellandi.*

Type.  $\frac{5}{6}$ .

straight upper profile, as long as broad, as long as postocular part of head,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as eye, which is 4 to  $4\frac{1}{2}$  times in length of head, and equals interorbital width or præorbital depth; mouth moderate, extending to between nostril and eye; teeth in 3 or 4 series, outer largest, 36 to 50 in upper jaw; 4 series of scales on the cheek, width of scaly part equal to diameter of eye or a little more. Lower pharyngeal teeth with spherical crowns. Gill-rakers short, 10 to 13 on lower part of anterior arch. Dorsal XV 13-14; spines increasing in length to the seventh or to the last, which measures  $\frac{2}{3}$  to nearly  $\frac{1}{2}$  length of head; longest soft rays about  $\frac{2}{3}$  length of head. Anal III 9-10;



third spine a little shorter than last dorsal. Pectoral a little shorter than head, not reaching vertical of origin of anal. Ventral reaching vent or origin of anal. Caudal rounded. Caudal peduncle as long as deep. Scales cycloid, 34–37  $\frac{3\frac{1}{2}-4\frac{1}{2}}{11-13}$ ; lateral lines  $\frac{21-23}{12-16}$ . Brownish, with or without nine rather indistinct dark bars; dorsal fin edged with yellowish; soft dorsal and caudal with numerous round blackish spots; anal with round white or brownish (red ?) spots; ventrals blackish.

Total length 200 millim.

Lake Bangwelu and Upper Zambesi \*.

1. Type.	L. Bangwelu.	F. H. Melland, Esq., and Father Foulon (P.).
2–3. Ad.	„	F. H. Melland, Esq. (P.).

#### 40. PARATILAPIA NOTOTÆNIA.

Bouleng. Ann. & Mag. N. H. (7) x. 1902, p. 69; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 264.

Depth of body  $2\frac{2}{3}$  times in total length, length of head 3 times. Head twice as long as broad, with strongly curved upper profile; snout rounded, a little broader than long, shorter than postocular part of head; eye 4 times in length of head, a little less than interorbital width or præorbital depth; mouth extending to below anterior border of eye; teeth in 5 series, outer largest, about 70 in upper jaw; 3 series of scales on the cheek, width of scaly part greater than diameter of eye. Gill-rakers short, 11 on lower part of anterior arch. Dorsal XVII 10; spines increasing in length to the last, which measures a little more than  $\frac{1}{3}$  length of head. Anal III 9; third spine  $\frac{1}{3}$  length of head. Caudal scaly, feebly but distinctly emarginate. Caudal peduncle nearly  $1\frac{1}{2}$  times as long as broad. Scales finely denticulate, 36  $\frac{3}{12}$ ; lateral lines  $\frac{23}{9}$ . Brown above, white beneath; a blackish band along each side of the back, above the lateral line; dorsal fin with regular series of round brown spots between the rays; anal and ventrals blackish.

Total length 230 millim.

Lake Nyassa.

1. Type.	L. Nyassa.	Prof. J. E. S. Moore (C.).
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\* I have examined a specimen from the Kafue River, preserved in the Bulawayo Museum.



## 41. PARATILAPIA DIMIDIATA.

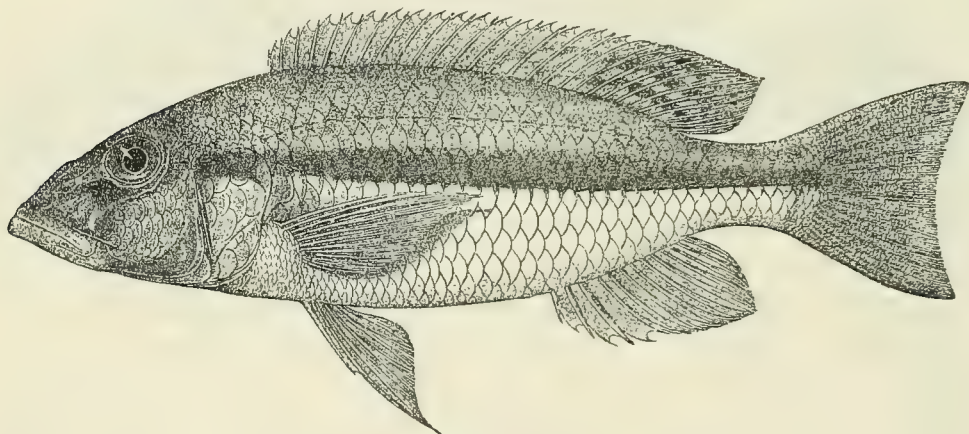
*Chromis lateristriga*, part., Günth. Proc. Zool. Soc. 1864, p. 312.

*Hemichromis dimidiatus*, Günth. t. c. p. 313.

*Paratilapia dimidiata*, Bouleng. Proc. Zool. Soc. 1898, p. 145; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 264.

Depth of body 3 to  $3\frac{1}{2}$  times in total length, length of head  $2\frac{4}{5}$  to 3 times. Head  $2\frac{1}{4}$  to  $2\frac{1}{2}$  times as long as broad, with straight or slightly curved upper profile; lower jaw projecting; snout rounded, as long as broad or a little longer than broad, as long as postocular part of head; eye  $4\frac{1}{2}$  to  $5\frac{1}{2}$  times in length of head,  $1\frac{1}{4}$  to  $1\frac{1}{3}$  times in inter-orbital width, equal to or a little less than præorbital depth; mouth not extending to below anterior border of eye; teeth in 3 to 5 series, outer moderate or rather large, 40 to 60 in upper jaw; 4 or 5 series of scales on the cheek, width of scaly part equal to or greater than

Fig. 244.

*Paratilapia dimidiata*.

L. Nyassa.  $\frac{2}{3}$ .

diameter of eye. Gill-rakers short, 10 or 11 on lower part of anterior arch. Dorsal XVI–XVIII 10–12; spines increasing in length to the last, which measures  $\frac{1}{3}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{4}$  length of head. Anal III 10–11; third spine as long as middle dorsals. Pectoral  $\frac{2}{3}$  to  $\frac{4}{5}$  length of head, not extending to vertical or origin of anal. Ventral not reaching beyond vent. Caudal densely scaled, feebly but distinctly emarginate. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times as long as deep. Scales cycloid or very indistinctly denticulate, 34–36  $\frac{3-4}{12-14}$ ; lateral lines  $\frac{22-25}{15-19}$ . Olive-brown above, silvery white beneath; a blackish

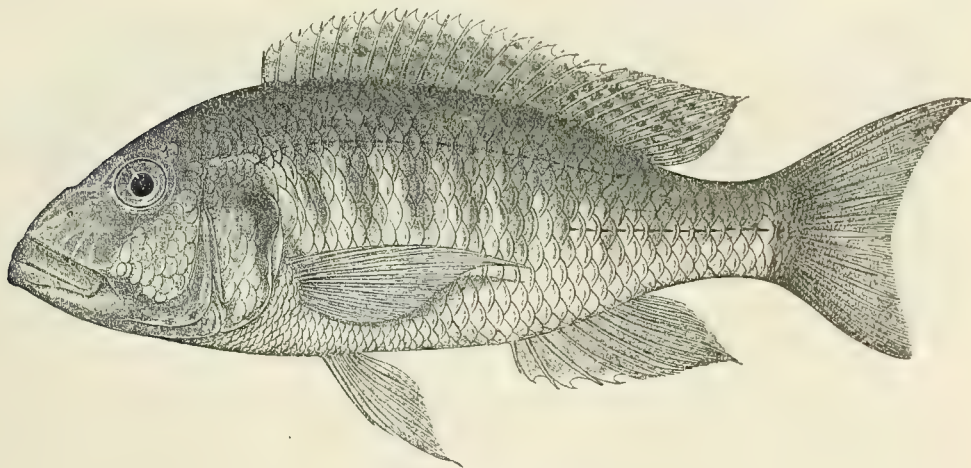
stripe along each side, either from the gill-cover to the base of the caudal or from below the origin of the dorsal, above the lateral line, to the base of the caudal; a blackish spot on each side of the snout and another on the operculum; fins whitish or greyish, dorsal often with brown spots.

Total length 240 millim.

Lake Nyassa and Upper Shiré River.

1. Skin, type.	L. Nyassa.	Sir J. Kirk (C.).
2. Skin, one of the types of <i>C. lateristriga</i> .	"	Dr. Livingstone (C.); Earl Russell (P.).
3. Ad.	"	Prof. J. E. S. Moore (C.).
4. Skel.	"	"
5-6. Ad.	"	Capt. E. L. Rhoades (P.).
7. Ad.	Upper Shiré.	Dr. Percy Rendall (C.); Sir H. H. Johnston (P.).

Fig. 245.



*Paratilapia rhoadesii*.

Type.  $\frac{1}{2}$ .

#### 42. PARATILAPIA RHOADESII.

Bouleng. Ann. & Mag. N. H. (8) ii. 1908, p. 239.

Depth of body equal to length of head, 3 times in total length. Head twice as long as broad, with curved upper profile; lower jaw not or but slightly projecting; snout rounded, as long as broad, as long as postocular part of head; eye 5 to  $5\frac{2}{3}$  times in length of head, 2 to  $2\frac{1}{2}$  times in length of snout,  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times in interorbital width,  $\frac{2}{3}$  præ-orbital depth; mouth not extending to below anterior border of eye;

teeth in 4 or 5 series, outer rather small, about 80 in upper jaw; 5 series of scales on the cheek, width of scaly part  $1\frac{1}{2}$  diameters of eye. Gill-rakers rather short, 11 on lower part of anterior arch. Dorsal XVI-XVII 12; spines equal from the eighth or ninth, not quite  $\frac{1}{3}$  length of head; longest soft rays  $\frac{2}{5}$  to  $\frac{3}{4}$  length of head. Anal III 10-11; third spine a little shorter than longest dorsals. Pectoral a little shorter than head, reaching vertical of origin of anal, or not quite so far. Ventral not reaching beyond vent. Caudal densely scaled, distinctly emarginate. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times as long as deep. Scales very finely denticulate, 37-38  $\frac{4-5}{12-14}$ ; lateral lines  $\frac{25-26}{15-17}$ . Dark green above, pale green or silvery below, with seven or eight ill-defined darker vertical bars on the body; a blackish opercular spot; dorsal green, edged with yellow, with round darker spots; anal and ventrals green, edged with yellow, or yellow; pectorals yellow.

Total length 360 millim.

Lake Nyassa.

1-2. Types.

L. Nyassa.

Capt. E. L. Rhoades (P.).

#### 43. PARATILAPIA CHRYSONOTA.

Bouleng. Ann. & Mag. N. H. (8) ii. 1908, p. 239.

Depth of body  $2\frac{3}{5}$  to  $2\frac{3}{4}$  times in total length, length of head 3 to  $3\frac{1}{4}$  times. Head 2 to  $2\frac{1}{4}$  times as long as broad, with straight or slightly concave upper profile; snout rounded, as long as broad, as long as or a little shorter than postocular part of head; eye  $2\frac{2}{3}$  to 3 times in length of head, a little exceeding interorbital width and nearly double least depth of præorbital; mouth not extending to below anterior border of eye; teeth very small, in 3 or 4 series, 60 to 70 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part  $\frac{1}{2}$  to  $\frac{3}{5}$  diameter of eye. Gill-rakers rather long, closely set, 17 to 20 on lower part of anterior arch. Dorsal XV-XVI 9-11; spines increasing in length to the last, which measures  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{3}{5}$  to  $\frac{5}{6}$  length of head. Anal III 10-11; third spine about  $\frac{2}{5}$  length of head. Pectoral as long as head or a little longer, extending to vertical of origin of anal. Caudal scaly, distinctly emarginate. Caudal peduncle a little longer than deep. Scales finely denticulate, 32-34  $\frac{3-3\frac{1}{2}}{10-11}$ ; lateral lines  $\frac{21-27}{12-18}$ . Females brownish above and silvery white beneath, with three black spots on each side, the first below the middle of the spinous dorsal, the second below the soft dorsal, the third



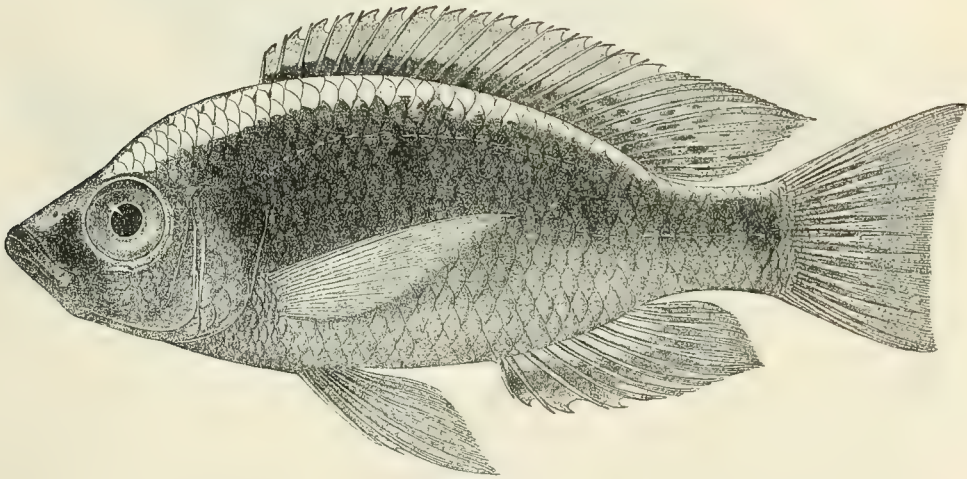
at the base of the caudal; these spots less distinct in males, which are much darker, sometimes blackish brown above and below, with the top of the head and back golden yellow, and with the dorsal and anal fins yellow, usually black at the base, or with round black spots on the soft portion of the dorsal; pectorals yellowish, ventrals yellowish in females, often black in males.

Total length 130 millim.

Lake Nyassa.

1-20. Types.	L. Nyassa.	Capt. E. L. Rhoades (P.).
21, 22. Skels.	"	"
23-25. Ad.	"	Sir H. H. Johnston (P.).

Fig. 246.



*Paratilapia chrysenota.*

Type.

#### 44. PARATILAPIA INTERMEDIA.

*Hemichromis intermedius*, Günth. Proc. Zool. Soc. 1864, p. 312.

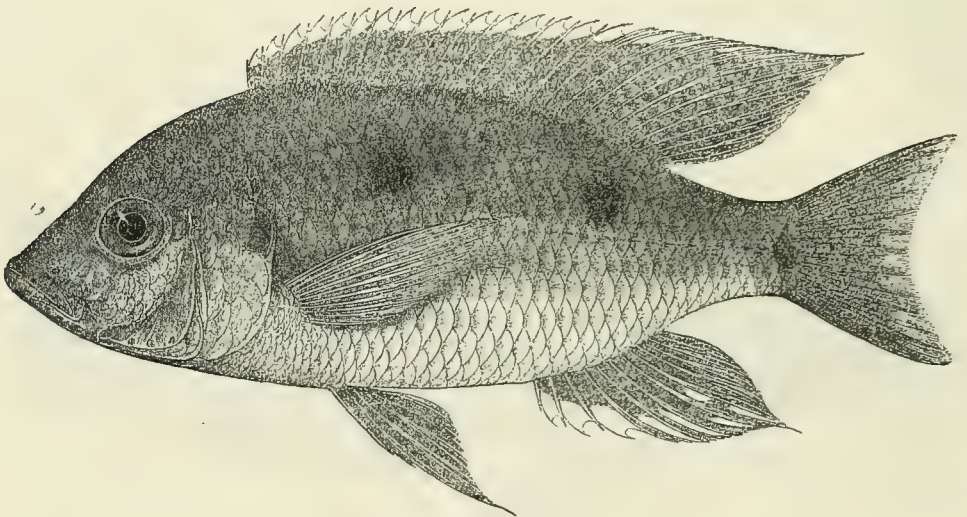
*Paratilapia intermedia*, Bouleng. Proc. Zool. Soc. 1898, p. 145; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 269.

Depth of body  $2\frac{1}{3}$  to  $2\frac{3}{4}$  times in total length, length of head 3 to  $3\frac{1}{2}$  times. Head 2 to  $2\frac{1}{4}$  times as long as broad, with straight or slightly concave upper profile; snout rather pointed, as long as broad or a little longer than broad, shorter than postocular part of head; eye 3 to 4 times in length of head, equal to or rather more than interorbital width,



exceeding præorbital depth; mouth not extending to below anterior border of eye; teeth small, in 2 or 3 series, outer largest, 50 to 80 in upper jaw; 2 or 3 series of scales on the cheek, width of scaly part equal to or less than diameter of eye. Gill-rakers rather long, closely set, 23 to 27 on lower part of anterior arch. Dorsal XVI-XVIII 10-12; spines increasing in length to the last, which measures  $\frac{1}{2}$ , or a little less than  $\frac{1}{2}$  length of head; longest soft rays usually  $\frac{1}{2}$  to  $\frac{4}{5}$  length of head, sometimes quite as long as head. Anal III 9-12; third spine  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head. Pectoral as long as head or a little shorter, not

Fig. 247.

*Paratilapia intermedia.*Type.  $\frac{2}{3}$ .

extending to vertical of origin of anal. Ventral reaching vent, or produced beyond origin of anal. Caudal more or less scaly, distinctly emarginate. Caudal peduncle as long as deep or a little longer than deep. Scales finely denticulate, 33-36  $\frac{3-4}{10-11}$ ; lateral lines  $\frac{20-31}{14-18}$ , upper often extending to the caudal peduncle, where it is separated from the lower by a single series of scales. Pale olive to dark brown, with a more or less distinct blackish spot under the lateral line, below middle of spinous dorsal, and another at base of caudal; sometimes a third between the two lateral lines, below soft dorsal; usually a blackish opercular spot; dorsal and anal dark brown, with or without round

light spots, in males with a broad yellow edge; pectorals yellowish, ventrals dark brown or black.

Total length 200 millim.

Lake Nyassa.

1. Skin, type.	L. Nyassa.	Sir J. Kirk (C.).
2-7. Ad. & hgr.	"	Capt. E. L. Rhoades (P.).
8. Skel.	"	"
9-10. Ad.	Between Kondowe and Karonga.	A. Whyte, Esq. (C.); Sir H. H. Johnston (P.).

#### 45. PARATILAPIA SCHWEBISCHI.

*Hemichromis schwebischi*, Sauv. Bull. Soc. Zool. France, 1884, p. 198, pl. v. fig. 2.  
*Paratilapia schwebischi*, Bouleng. Proc. Zool. Soc. 1898, p. 144; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 268.

Depth of body  $2\frac{1}{2}$  times in total length, length of head  $2\frac{3}{4}$  to  $2\frac{5}{6}$  times. Head about twice as long as broad; snout with concave upper profile, a little more than twice as long as eye, which is  $5\frac{1}{2}$  times in length of head and twice in interorbital width; mouth extending a little beyond the vertical of the nostril; teeth in broad bands, in 5 series, 80 to 84 in outer series of upper jaw; 3 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers rather short, 20 to 22 on lower part of anterior arch. Dorsal XV 11; spines increasing in length to the last, which is a little less than  $\frac{1}{2}$  as long as head and  $\frac{2}{3}$  length of longest soft rays. Anal III 9. Pectoral as long as head. Ventral reaching anal. Caudal slightly emarginate. Caudal peduncle as long as deep. Scales cycloid, 29-30  $\frac{3\frac{1}{2}}{10}$ ; lateral lines  $\frac{18-20}{11-12}$ . Olive, scales on posterior part of body golden in the centre; spinous dorsal marbled with purplish; posterior part of soft dorsal and caudal with blue spots; pectorals and ventrals whitish.

Total length 320 millim.

Upper Ogowe.—Type, in Paris Museum, examined.

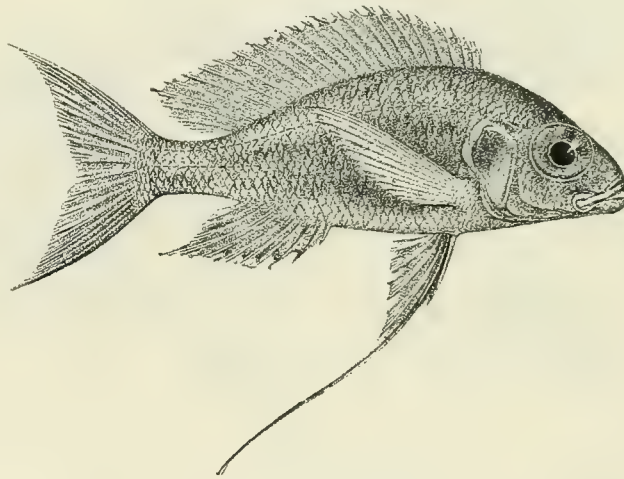
#### 46. PARATILAPIA VENTRALIS.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 13, pl. iii. fig. 3, and Poiss. Bass. Congo, p. 424 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 270; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 563.

Depth of body  $2\frac{1}{2}$  to 3 times in total length, length of head 3 times.

Head twice as long as broad; snout with curved upper profile, rounded, broader than long, as long as postocular part of head, shorter than eye, which is  $2\frac{2}{3}$  to  $2\frac{3}{4}$  times in length of head, equals interorbital width and 3 times præorbital depth; mouth extending to below anterior fourth of eye; teeth very small, in 2 or 3 series, 70 to 90 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part not  $\frac{1}{2}$  diameter of eye. Gill-rakers rather long, 17 to 19 on lower part of anterior area. Dorsal XII-XIII 12-14; spines subequal from the eighth or ninth, which measures nearly  $\frac{1}{2}$  length of head and  $\frac{3}{4}$  to  $\frac{4}{5}$  longest soft rays. Anal III 9-10; third spine about  $\frac{2}{5}$  length of head. Pectoral as long as or a little longer than head, extending to vertical of

Fig. 248.

*Paratilapia ventralis*.Type (Tr. Z. S. 1898).  $\frac{5}{6}$ .

origin of anal or a little beyond. Ventral produced into a very long filament, which, in males, is bifid at the end and may reach the caudal fin. Caudal with deep crescentic notch. Caudal peduncle  $1\frac{1}{4}$  to  $1\frac{1}{2}$  times as long as deep. Scales denticulate, 34-36  $\frac{4}{13-14}$ ; lateral lines  $\frac{30-36}{10-16}$ , the upper extending to the caudal peduncle, or to the root of the caudal. Greyish brown to blackish, with or without irregular darker or lighter spots; fins grey or dorsal and anal blue-green edged with blackish; ventrals of males black, with the end bright yellow.

Total length 92 millim.

Lake Tanganyika.



1. Type.	Mbity Rocks.	Prof. J. E. S. Moore (C.).
2-7. Types.	Kinyamkolo.	"
8. Ad.	Sumbu.	Dr. W. A. Cunningham (C.).
9. Skel.	"	"

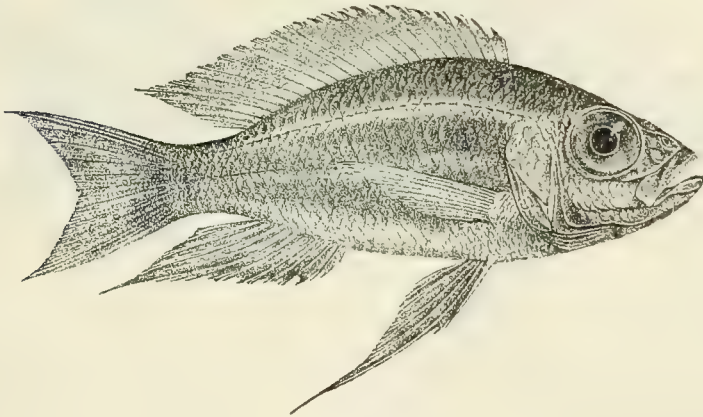
## 47. PARATILAPIA DEWINDTI.

*Aulonocrenus*

Bouleng. Tr. Zool. Soc. xv. 1899, p. 88, pl. xviii. fig. 2, Ann. Mus. Congo, Zool. i. p. 141, pl. liii. fig. 2 (1900), and Poiss. Bass. Congo, p. 424 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 271; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 563.

Depth of body equal to length of head,  $2\frac{3}{4}$  to 3 times in total length. Head twice as long as broad; snout with curved upper profile, rounded, broader than long, as long as postocular part of head, shorter than eye,

Fig. 249.



*Paratilapia dewindti*.  
Type (Tr. Z. S. 1899).

which is  $2\frac{2}{3}$  to  $2\frac{3}{4}$  times in length of head, exceeds interorbital width, and equals 3 times præorbital depth; mouth extending to below anterior fourth of eye; teeth very small, in 3 or 4 series, 80 to 90 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part not  $\frac{1}{2}$  diameter of eye. Gill-rakers rather long, 17 to 19 on lower part of anterior arch. Dorsal XII-XIII 12-13; spines subequal from the eighth or ninth, which measures  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head, and  $\frac{3}{4}$  to  $\frac{4}{5}$  length of longest soft rays. Anal III 9; third spine  $\frac{2}{5}$  length of head. Pectoral a little shorter than head, extending to vertical of origin of anal. Ventral produced into a filament, reaching beyond origin of anal.



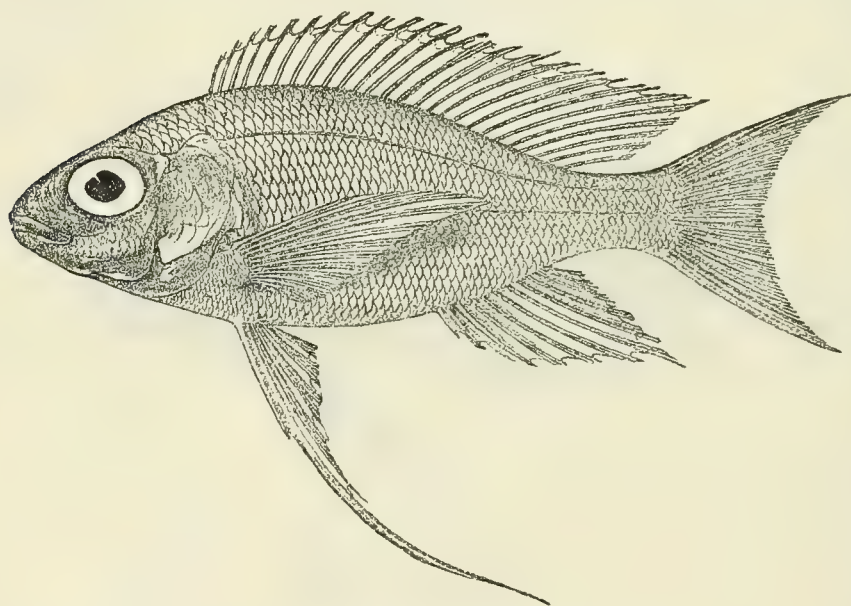
Caudal with deep crescentic notch. Caudal peduncle  $1\frac{1}{3}$  times as long as deep. Scales denticulate, 36–38  $\frac{4}{13-14}$ ; lateral lines  $\frac{29-34}{10-18}$ , the upper extending to the caudal peduncle, or to the root of the caudal. Grey or olive above, white beneath; four yellow stripes along each side; pectorals yellowish, other fins dark grey or blackish.

Total length 100 millim.

Lake Tanganyika.—Types in Congo Museum, Tervueren.

- |                      |         |                            |
|----------------------|---------|----------------------------|
| 1. One of the types. | Moliro. | Capt. Lemaire (C.).        |
| 2. Ad.               | Sumbu.  | Dr. W. A. Cunningham (C.). |
| 3. Ad.               | Lofu R. | "                          |

Fig. 250.



*Paratilapia furcifera*.  
Type (Tr. Z. S. 1898).

#### 48. PARATILAPIA FURCIFERA.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 14, pl. iv. fig. 1, and Poiss. Bass. Congo, p. 425 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 273; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 563.

Depth of body nearly equal to length of head, 3 times in total length. Head twice as long as broad; snout with curved upper profile, rounded, broader than long, as long as or a little shorter than postocular part of head, as long as or a little shorter than eye, which is  $2\frac{2}{3}$  to 3 times in

length of head, equals interorbital width, and nearly 3 times præorbital depth; mouth extending to below anterior border of eye; teeth very small, in 3 series, 50 to 60 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part not half diameter of eye. Gill-rakers short, 14 to 16 on lower part of anterior arch. Dorsal XIII–XIV 12–14; spines thin, slender, increasing in length to the ninth or tenth, which measures a little less than  $\frac{1}{2}$  length of head. Anal III 9; third spine  $\frac{2}{5}$  length of head. Pectoral as long as or a little longer than head, extending to vertical of origin of anal or a little beyond. Ventral much produced, reaching caudal or nearly as far. Caudal with deep crescentic notch, the outer rays more or less produced. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. Scales denticulate, 60–64  $\frac{4-6}{16-18}$ ; lateral lines  $\frac{50-58}{23-33}$ , the upper extending to the caudal peduncle, or nearly to the base of the caudal. Bluish or olive above, silvery white below; gill-cover yellow; yellow streaks may be present on the body; dorsal and anal with yellow streaks; caudal yellow, with dark upper and lower margins.

Total length 135 millim.

Lake Tanganyika.

1–2. Types.	Kinyamkolo.	Prof. J. E. S. Moore (C.).
3. Ad.	Niamkolo.	Dr. W. A. Cunningham (C.).
4. Ad.	Sumbu.	„
5. Skel.	„	„

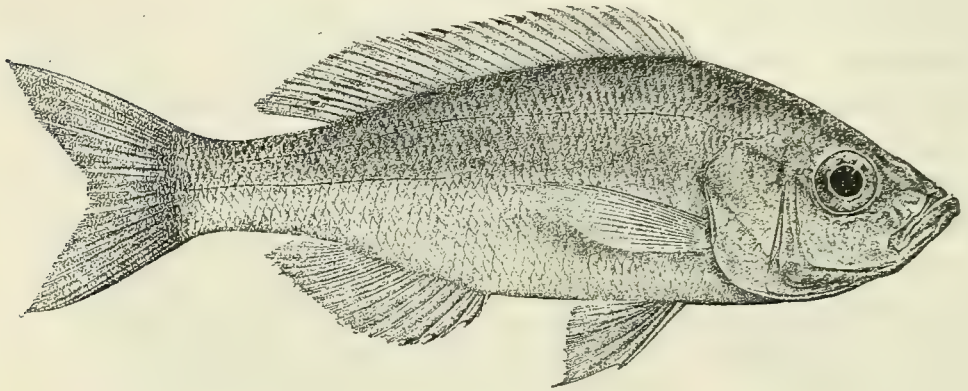
#### 49. PARATILAPIA STENOSOMA.

Bouleng. Ann. & Mag. N. H. (7) vii. 1901, p. 2, Tr. Zool. Soc. xvi. 1901, p. 151, pl. xvii. fig. 1, and Poiss. Bass. Congo, p. 426 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 272; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 564.

Depth of body nearly equal to length of head,  $2\frac{3}{4}$  to 3 times in total length. Head  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times as long as broad; lower jaw projecting; snout with straight or slightly convex upper profile, as long as broad or slightly longer than broad, shorter than postocular part of head, nearly as long as eye, which is  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times in length of head, equals interorbital width, and exceeds præorbital depth; mouth not extending to below anterior border of eye; teeth small, in 2 or 3 series, 90 to 100 in outer series of upper jaw; 2 series of scales on the cheek, width of scaly part  $\frac{3}{5}$  to  $\frac{2}{3}$  diameter of eye. Gill-rakers rather long and closely set, 19 to 28 on lower part of anterior arch. Dorsal XV 13;

spines increasing in length to the last, which measures  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; soft rays only a little longer, unless produced into filaments. Anal III 12-14; third spine a little shorter but stouter than last dorsal. Pectoral  $\frac{4}{5}$  to  $\frac{5}{6}$  length of head, extending to vertical of origin of anal. Ventral reaching vent. Caudal deeply notched. Caudal peduncle nearly twice as long as deep. Scales cycloid or indistinctly denticulate, 60-69  $\frac{6}{13-16}$ ; lateral lines  $\frac{54-69}{31-36}$ , the upper extending to caudal peduncle or to root of caudal. Brownish above; silvery white

Fig. 251.

*Paratilapia stenosoma.*Type (Tr. Z. S. 1901).  $\frac{1}{2}$ .

beneath, with or without blackish spots and longitudinal bands; dorsal blackish at the tips of the rays.

Total length 240 millim.

Lake Tanganyika.

1-2. Types.	S. end of L. Tanganyika.	Prof. J. E. S. Moore (C.).
3. Type.	Maswa, S. of Ujiji.	"
4. Ad.	Kaboge.	Dr. W. A. Cunningham (C.).

#### 50. PARATILAPIA MICROLEPIS.

*Tilapia microlepis*, Bouleng. Tr. Zool. Soc. xv. 1899, p. 94, pl. xx. fig. 3, Ann. Mus. Congo, Zool. i. p. 151, pl. lv. fig. 3 (1900), Poiss. Bass. Congo, p. 478 (1901), and Tr. Zool. Soc. xvi. 1901, p. 158, and xvii. 1906, p. 572.

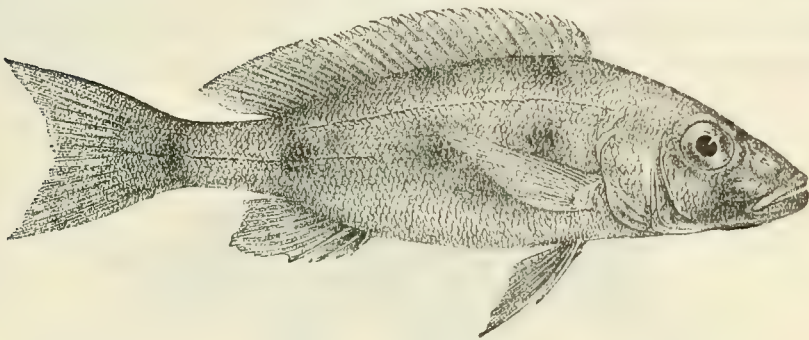
*Boulengerochromis microlepis*, Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 304.

Depth of body  $3\frac{1}{4}$  to 4 times in total length, length of head 3 to  $3\frac{1}{3}$  times. Head 2 to  $2\frac{1}{2}$  times as long as broad, with feebly curved upper profile; snout obtusely pointed, longer than broad, as long as



postocular part of head,  $1\frac{1}{2}$  to 2 diameters of eye, which is continued 4 to 5 times in length of head, 1 to  $1\frac{1}{2}$  times in interorbital width and does not exceed præorbital depth; mouth extending to between nostril and eye; teeth small, in 4 or 5 series, outer bicuspid in the young, 60 to 90 in upper jaw; 7 or 8 series of scales on the cheek, width of scaly part nearly equal to or a little greater than diameter of eye. Gill-rakers rather short, 13 to 15 on lower part of anterior arch. Dorsal XVI-XVII 13-15; spines subequal from the fifth or sixth,  $\frac{1}{4}$  to  $\frac{1}{3}$  length of head; longest soft rays about  $\frac{2}{5}$  length of head. Anal III

Fig. 252.

*Paratilapia microlepis.*

Type (Tr. Z. S. 1899).

9-10; third spine as long as and stronger than longest dorsals. Pectoral  $\frac{3}{4}$  to  $\frac{5}{6}$  length of head, not extending to vertical of origin of anal. Ventral widely separated from vent. Caudal with deep crescentic notch. Caudal peduncle 2 to  $2\frac{1}{2}$  times as long as deep. Scales cycloid, 75-90  $\frac{9-10}{23-30}$ ; lateral lines  $\frac{45-54}{34-50}$ . Light olive-brown above, white beneath; traces of dark bars across the back and four round blackish spots on each side of the body, the fourth on the caudal peduncle; fins yellowish or pale brown.

Total length 440 millim.; grows to 610 or more.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

1. One of the types.	Moliro.	Capt. Lemaire (C.).
2. Ad.	Kalambo.	Prof. J. E. S. Moore (C.).
3-4. Ad.	Niamkolo.	Dr. W. A. Cunningham (C.).
5. Skel.	Albertville.	Capt. Hecq (C.).

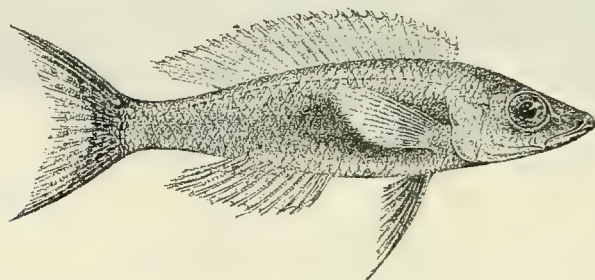


## 51. PARATILAPIA LEPTOSOMA.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 14, pl. iii. fig. 4, and Poiss. Bass. Congo, p. 427 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 271.

Depth of body 4 to  $4\frac{1}{2}$  times in total length, length of head 3 to  $3\frac{1}{4}$  times. Head  $2\frac{1}{3}$  to  $2\frac{1}{2}$  times as long as broad, with straight or slightly concave upper profile; snout obtusely pointed, as long as broad, shorter than postocular part of head, as long as or a little longer than eye, which is  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times in length of head, equals interorbital width, and much exceeds præorbital depth; mouth very protractile, præmaxillary processes very long and extending to between orbits; maxillary extending to below anterior border of eye, or not quite so far; teeth small, in 3 series, about 60 in outer series of upper jaw; 2 series of scales on the cheek, width of scaly part about  $\frac{1}{2}$  diameter

Fig. 253.

*Paratilapia leptosoma.*

Type (Tr. Z. S. 1898).  $\frac{5}{8}$ .

of eye. Gill-rakers long and closely set, about 20 on lower part of anterior arch. Dorsal XII–XIV 14–16; spines increasing in length to the last, which measures  $\frac{2}{5}$  length of head and nearly equals longest soft rays. Anal III 10–12; third spine a little shorter than last dorsal. Pectoral  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head, reaching or nearly reaching vertical of origin of anal. Ventral reaching origin of anal. Caudal deeply notched. Caudal peduncle twice as long as deep. Scales rather strongly denticulate, 39–42  $\frac{2-3}{11-13}$ ; lateral lines  $\frac{27-33}{11-15}$ . Brown above, lighter beneath; dorsal and anal with or without brown longitudinal streaks; caudal often spotted with brown or black at the base.

Total length 92 millim.

Lake Tanganyika.

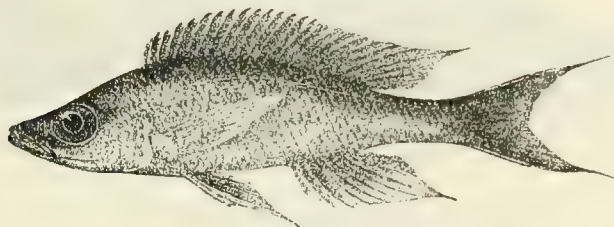
1–2. Types.	Mbete.	Prof. J. E. S. Moore (C.).
3. Type.	Kinyamkolo.	„
4–6. Ad.	Msambu.	„
7. Skel.	„	„

## 52. PARATILAPIA NIGRIPINNIS.

Bouleng. Ann. & Mag. N. H. (7) vii. 1901, p. 3, Poiss. Bass. Congo, p. 428 (1901), and Tr. Zool. Soc. xvi. 1901, p. 152, pl. xix. fig. 1; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 272.

Depth of body 4 times in total length, length of head 3 to  $3\frac{1}{4}$  times. Head  $2\frac{1}{3}$  times as long as broad, with slightly concave upper profile; snout obtusely pointed, as long as broad, shorter than postocular part of head, as long as eye, which is  $3\frac{1}{3}$  times in length of head, equals interorbital width, and much exceeds præorbital depth; mouth very protractile, præmaxillary processes very long and extending to between orbits; maxillary extending to below anterior border of eye; teeth very small, in 3 series, about 60 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part hardly  $\frac{1}{2}$  diameter of eye.

Fig. 254.



*Paratilapia nigripinnis*.  
Type (Tr. Z. S. 1901).

Gill-rakers long and closely set, 20 on lower part of anterior arch. Dorsal XV–XVII 11; spines increasing in length to the last, which measures  $\frac{2}{3}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{4}$  length of head. Anal III 8–9; third spine as long as last dorsal. Pectoral as long as head, reaching origin of anal. Ventral reaching origin of anal or beyond. Caudal deeply notched, the lobes produced into filaments. Caudal peduncle twice as long as deep. Scales rather strongly denticulate, 39–40  $\frac{3}{11}$ ; lateral lines  $\frac{29-30}{13-16}$ . Dark brown, lighter beneath; fins blackish, the caudal edged with white above and beneath.

Total length 80 millim.

Lake Tanganyika.

1–2. Types.

Msambu.

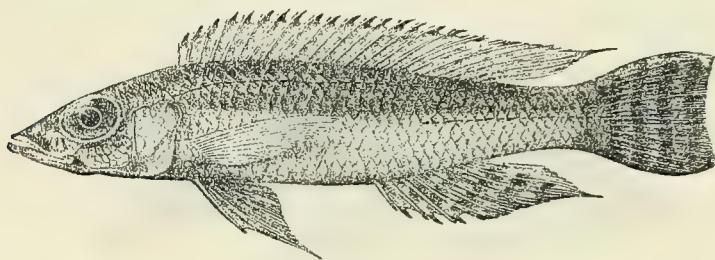
Prof. J. E. S. Moore (C.).

## 53. PARATILAPIA CALLIURA.

Bouleng. Ann. & Mag. N. H. (7) vii. 1901, p. 2, Poiss. Bass. Congo, p. 422 (1901), and Tr. Zool. Soc. xvi. 1901, p. 151, pl. xix. fig. 3; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 269.

Depth of body 4 to  $4\frac{1}{2}$  times in total length, length of head 3 to  $3\frac{1}{3}$  times. Head  $2\frac{1}{2}$  times as long as broad, with straight or slightly convex upper profile; lower jaw projecting; snout pointed, as long as broad, as long as or a little shorter than eye, which is 3 to  $3\frac{1}{3}$  times in length of head, and measures at least twice interorbital width or least præorbital width; mouth very protractile, præmaxillary processes very long and extending to between orbits; maxillary extending to below anterior

Fig. 255.

*Paratilapia calliura.*

Type (Tr. Z. S. 1901).

fourth of eye; teeth very small, in 2 series, about 80 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part about  $\frac{1}{2}$  diameter of eye. Gill-rakers moderately large, 15 on lower part of anterior arch. Dorsal XVI–XVII 10; spines increasing in length to the last, which measures  $\frac{2}{3}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Anal III 7–8; third spine a little shorter than last dorsal. Pectoral a little shorter than head. Ventral reaching vent. Caudal truncate or feebly emarginate. Caudal peduncle  $1\frac{1}{2}$  times as long as deep. Scales rather strongly denticulate, 37–40  $\frac{2-3}{9-10}$ ; lateral lines  $\frac{25-29}{13-17}$ . Pale brownish above, silvery beneath; a blackish opercular spot, dorsal and anal edged with black; 4 or 5 black bars across the caudal; young with black bars across the dorsal.

Total length 110 millim.

Lake Tanganyika.

1–3. Types.

Kalambo.

Prof. J. E. S. Moore (C.).

4. Skel.

..

..

## 12. NANNOCHROMIS.

*Pseudoplesiops* (non Bleek.), Bouleng. Ann. Mus. Congo, Zool. i. p. 121 (1899), and Poiss. Bass. Congo, p. 431 (1901).

*Nannochromis*, Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 273.

Distinguished from *Paratilapia* by the position of the upper lateral line, which is much higher up, nearly the whole, or at least a considerable part, of its course running along the series of scales contiguous to the base of the dorsal fin. Scales cycloid.

Congo.

*Synopsis of the Species.*

- D. XVIII-XIX 8; Lat. 1.  $\frac{12-14}{4-7}$ ; cheek  
naked . . . . . 1. *N. nudiceps*, Blgr., p. 375.  
D. XVII 8; Lat. 1.  $\frac{18}{5}$ ; cheek naked or with  
one or two scales below the eye . . . 2. *N. dimidiatus*, Pellegr., p. 376.  
D. XVII 8; Lat. 1.  $\frac{8-9}{3-4}$ ; 2 or 3 series of  
scales on the cheek . . . . . 3. *N. squamiceps*, Blgr., p. 376.

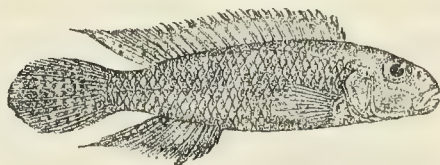
## 1. NANNOCHROMIS NUDICEPS.

*Pseudoplesiops nudiceps*, Bouleng. Ann. Mus. Congo, Zool. i. p. 122, pl. xlv. fig. 6 (1899), and Poiss. Bass. Congo, p. 431 (1901).

*Nannochromis nudiceps*, Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 273.

Depth of body  $3\frac{1}{2}$  to  $3\frac{3}{4}$  times in total length, length of head 3 to  $3\frac{1}{4}$  times. Head twice as long as broad, with curved upper profile;

Fig. 256.



*Nannochromis nudiceps*.

Type (A. M. C.).

snout a little longer than eye, which is  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times in length of head and a little exceeds interorbital width; mouth extending to below anterior border of eye; 3 or 4 series of teeth in upper jaw; head



entirely naked. Gill-rakers short, 9 or 10 on lower part of anterior arch. Dorsal XVIII–XIX 8; spines increasing in length to the last, which measures  $\frac{1}{2}$  length of head; longest soft ray at least  $\frac{2}{3}$  length of head. Anal III 7; third spine stronger and longer than last dorsal. Pectoral  $\frac{2}{3}$  length of head. Ventral not reaching vent. Caudal rounded, subacuminate. Caudal peduncle a little deeper than long. Scales 28–29 in longitudinal series, 18–19 in transverse series; lateral lines  $\frac{12-14}{4-7}$ . Pale olive-brown above, white beneath; sometimes a large purple spot on each side of the body; soft dorsal, anal, and caudal fins usually with transverse series of small brown spots; dorsal and anal edged with blackish.

Total length 66 millim.

Upper Congo.—Types in Congo Museum, Tervueren.

1. One of the types. Dolo, Stanley Pool. M. P. Delhez (C.).

## 2. NANNOCHROMIS DIMIDIATUS.

*Pelmatochromis dimidiatus*, Pellegr. Bull. Mus. Paris, 1900, p. 99.

*Nanochromis dimidiatus*, part., Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 274, pl. iv. fig. 2.

Depth of body nearly equal to length of head, 3 to  $3\frac{1}{3}$  times in total length. Upper profile of head slightly rounded; snout shorter than eye, which is about 3 times in length of head; mouth extending to below anterior border of eye; 4 or 5 series of teeth in upper jaw; cheek naked or with one or two scales below the eye. 8 gill-rakers on lower part of anterior arch. Dorsal XVII 8; spines subequal from the third. Anal III 6. Pectoral  $\frac{2}{3}$  length of head. Ventral produced into a more or less filiform ray. Caudal rounded. Caudal peduncle as long as deep. Scales 25 in longitudinal series, 13 in transverse series; lateral lines  $\frac{18}{5}$ . Pale brown; a dark lateral band from behind the eye to the caudal; soft parts of vertical fins with series of dark dots between the rays.

Total length 62 millim.

Banghi, Ubanghi.—Types in Paris Museum.

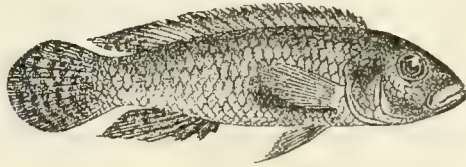
## 3. NANNOCHROMIS SQUAMICEPS.

*Pseudoplesiops squamiceps*, Bouleng. Proc. Zool. Soc. 1902, i. p. 270, pl. xxx. fig. 1.

*Nanochromis dimidiatus*, part., Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 274.

Depth of body  $3\frac{1}{2}$  times in total length, length of head 3 times. Head twice as long as broad, with curved upper profile; snout a little longer than eye, which is  $3\frac{1}{2}$  times in length of head and equals interorbital width; mouth with broad thick lips, extending to below anterior border of eye; 3 series of teeth in upper jaw; 2 or 3 series of scales on the cheek. 8 gill-rakers on lower part of anterior arch. Dorsal XVII 8; spines subequal from the sixth, barely  $\frac{1}{3}$  length of head; longest soft rays  $\frac{2}{3}$  length of head. Anal III 6; third spine longer than dorsals. Pectoral about  $\frac{2}{3}$  length of head. Ventral

Fig. 257.

*Nannochromis squamiceps.*Type (P. Z. S. 1882).  $\frac{5}{8}$ .

not reaching vent. Caudal rounded. Caudal peduncle as long as deep. Scales 29 in longitudinal series, 13 or 14 in transverse series; lateral lines  $\frac{8-9}{3-4}$ , upper forming an interrupted series. Pale brownish above, white beneath; a dark horizontal streak on each side of the head, behind the eye; soft dorsal, anal, and caudal fins with numerous transverse series of small dark spots.

Total length 65 millim.

Lindi River, Upper Congo.—Types in Brussels Museum.

- |                      |          |                       |
|----------------------|----------|-----------------------|
| 1. One of the types. | Lindi R. | M. M. Storms (C.);    |
|                      |          | Brussels Museum (E.). |

### 13. PELMATOCHROMIS.

Steind. Notes Leyd. Mus. xvi. 1894, p. 40; Bouleng. Proc. Zool. Soc. 1898, p. 147, and Poiss. Bass. Congo, p. 433 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 275; Bouleng. Fish. Nile, p. 484 (1907).

*Chromidotilapia*, Bouleng. Proc. Zool. Soc. 1898, p. 151.

Barely distinguishable from *Paratilapia* by the greater development of a papillose pad on each side of the pharynx, close to the upper

part of the branchial arches, and appearing as a strong prominence in front of the latter when the gill-cover is lifted up\*.

Africa.

*Synopsis of the Species.*

- I. Lower lateral line at least nearly as long as upper; caudal scaly, truncate or more or less distinctly emarginate; pectoral usually at least as long as head; scales cycloid or feebly denticulate.
- D. XV-XVI 13-15; A. III 8; Sc. 55-67  $\frac{6-8}{3}$  16-19. 1. *P. polylepis*, Blgr., p. 382.
- D. XIII-XV 16-17; A. III 8-9; Sc. 40-  
45  $\frac{5-6}{3}$  12-15. 2. *P. jentinki*, Stdr., p. 383.
- D. XIV-XVI 12-14; A. III. 7-8; Sc. 31-  
36  $\frac{4-5}{2}$  8-14. 3. *P. lateralis*, Blgr., p. 385.
- II. Lower lateral line much shorter than upper, confined to caudal region of body.
- A. Scales cycloid; caudal rounded, truncate, or slightly emarginate.
1. 12 to 20 gill-rakers on lower part of anterior arch; depth of body 2 to  $2\frac{2}{3}$  times in total length.
- D. XIII 11; A. III 8-9; Sc. 28-30  $\frac{4}{11}$ ; gill-rakers 18-20; teeth in 3 series; pectoral as long as head. 4. *P. congicus*, Blgr., p. 386.
- D. XV-XVII 9-12; A. III 7-8; Sc. 28-30  $\frac{2\frac{1}{2}}{9-10}$ ; gill-rakers 12-15; teeth in 2 to 4 series; pectoral much shorter than head. 5. *P. guentheri*, Sauv., p. 388.
- D. XIV 11; A. III 7; Sc. 28  $\frac{3\frac{1}{2}}{10}$ ; gill-rakers 14; teeth in 6 or 7 series; pectoral much shorter than head. 6. *P. regani*, Pellegr., p. 390.

\* Number of vertebræ in skeletons examined:—

- 13+12=25. *P. subocellatus*.  
 13+13=26. *P. nigrofasciatus*, *kingsleyæ*.  
 13+17=30. *P. cavifrons*.  
 14+12=26. *P. buettikoferi*.  
 14+13=27. *P. guentheri*, *kribensis*, *pulcher*.  
 14+17=31. *P. spekii*.  
 15+15=30. *P. lateralis*.  
 15+16=31. *P. auritus*.  
 16+16=32. *P. jentinki*.  
 16+18=34. *P. macrops*.

2. 7 to 12 gill-rakers on lower part of anterior arch.

a. Snout as long as or a little longer than eye in the adult ; depth of body 2 to  $2\frac{1}{3}$  times in total length ; pectoral as long as or a little shorter than head.

D. XIV-XV 10-12 ; A. III 8 ; Sc. 27-29  $\frac{2\frac{1}{2}-3}{10-11}$  ;

caudal truncate or slightly emarginate . . . 7. *P. buettikoferi*, Sldr., p. 390.

D. XIV-XV 10-12 ; A. III 8-9 ; Sc. 27-

29  $\frac{2\frac{1}{2}-3}{10-11}$  ; caudal rounded . . . . . 8. *P. ocellifer*, Blgr., p. 391.

b. Snout longer than eye in the adult ; depth of body  $2\frac{1}{2}$  to  $3\frac{1}{2}$  times in total length ; pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head.

$\alpha$ . Teeth in 2 to 4 series.

D. XIV-XVI 9-11 ; A. III 7-9 ; Sc. 26-

28  $\frac{2\frac{1}{2}}{9-10}$  ; gill-rakers 10-11 ; 3 or 4 series of [p. 393.  
scales on the cheek ; caudal rounded . . . 9. *P. nigrofasciatus*, Pellegr.,

D. XIV-XVI 9-11 ; A. III 7-8 ; Sc. 27-

29  $\frac{2-2\frac{1}{2}}{10-11}$  ; gill-rakers 7-9 ; 3 or 4 series of [p. 394.  
scales on the cheek ; caudal rounded . . . 10. *P. caudifasciatus*, Blgr.,

D. XIV-XVI 8-10 ; A. III 6-7 ; Sc. 28-

30  $\frac{2-2\frac{1}{2}}{8-9}$  ; gill-rakers 9-10 ; 2 or 3 series of  
scales on the cheek ; caudal subacuminate . 11. *P. longirostris*, Blgr., p. 395.

D. XVI 10-11 ; A. III 7-8 ; Sc. 25  $\frac{3}{10}$  ; 4 or 5

series of scales on the cheek ; caudal rounded 12. *P. boulengeri*, Lönnb., [p. 396.

D. XIV 11 ; A. III 7 ; Sc. 33  $\frac{3\frac{1}{2}}{9}$  ; 5 series of

scales on the cheek ; caudal truncate . . . 13. *P. welwitschii*, Blgr., p. 397.

$\beta$ . Teeth in a single series, or, if in two, the inner very short and irregular.

D. XIV-XVI 10-12 ; A. III 7-9 ; Sc. 27-

30  $\frac{2\frac{1}{2}}{9-10}$  ; gill-rakers 9-12 ; 3 or 4 series of  
scales on the cheek ; caudal rounded or  
rounded-subtruncate . . . . . 14. *P. kingsleyae*, Blgr., p. 398.

c. Snout not longer than eye ; pectoral  $\frac{2}{3}$  to  $\frac{4}{5}$  length of head.

$\alpha$ . Mouth extending to below anterior border of eye ; 2 or 3 series of scales on the cheek ; depth of body  $2\frac{1}{2}$  to 3 times in total length.

D. XIV-XVI 8-10 ; A. III 6-8 ; Sc. 25-28  $\frac{2-2\frac{1}{2}}{11}$  ;

60-70 teeth in outer series of upper jaw . . 15. *P. subocellatus*, Gthr., [p. 399.

D. XVI-XVII 8-9 ; A. III 6-7 ; Sc. 27-29  $\frac{2}{9}$  ;

40-50 teeth in outer series of upper jaw . . 16. *P. kribensis*, Blgr., p. 400.

D. XVII-XVIII 7-8 ; A. III 7 ; Sc. 28-29  $\frac{2}{9}$  ;

60 teeth in outer series of upper jaw . . . 17. *P. taeniatus*, Blgr., p. 401.



$\beta$ . Mouth not extending to below anterior border of eye.

- D. XVI 9-10; A. III 7-8; Sc. 27-29  $\frac{2-2\frac{1}{2}}{10}$ ;  
depth of body  $2\frac{2}{3}$  to 3 times in total length;  
caudal peduncle as long as deep; snout  
convex; 2 or 3 series of scales on the cheek;  
50-68 teeth in outer series of upper jaw . . . 18. *P. pulcher*, Blgr., p. 402.
- D. XV-XVI 10-11; A. III 8-9; Sc. 28  $\frac{2\frac{1}{2}-3}{10-11}$ ;  
depth of body  $2\frac{1}{3}$  to  $2\frac{2}{3}$  times in total  
length; caudal peduncle deeper than long;  
snout concave; 3 or 4 series of scales on the  
cheek; 60-70 teeth in outer series of upper  
jaw . . . . . 19. *P. arnoldi*, Blgr., p. 404.
- D. XV 9-10; A. III 7-8; Sc. 28-29  $\frac{2\frac{1}{2}}{10-11}$ ;  
depth of body  $2\frac{3}{5}$  to  $2\frac{3}{4}$  times in total  
length; caudal peduncle deeper than long;  
snout convex; 3 or 4 series of scales on the  
cheek; 50-66 teeth in outer series of upper  
jaw . . . . . 20. *P. annectens*, Blgr., p. 405.
- D. XV-XVI 10-11; A. III 8; Sc. 27-29  $\frac{2\frac{1}{2}-3}{10}$ ;  
depth of body  $2\frac{1}{5}$  to  $2\frac{2}{3}$  times in total  
length; caudal peduncle deeper than long;  
snout convex; 3 or 4 series of scales on the  
cheek; 44-56 teeth in outer series of upper  
jaw . . . . . 21. *P. ansorgii*, Blgr., p. 406.

B. Scales more or less distinctly denticulate.

1. Caudal rounded, truncate, or feebly emarginate; dorsal with 14 to 17 spines.

$\alpha$ . Lower jaw not projecting; pectoral  $\frac{2}{3}$  to  $\frac{4}{5}$  length of head.

$\alpha$ . 6 to 9 series of scales on the cheek; caudal rounded. [p. 407.]

D. XIV 14; A. III 8-9; Sc. 29-30  $\frac{5}{13}$  . . . 22. *P. multidentis*, Pellegr.,

D. XIV-XV 12-13; A. III 9-10; Sc. 33-

34  $\frac{3\frac{1}{2}-4}{13}$  . . . . . 23. *P. angolensis*, Sldr., p. 408.

$\beta$ . 3 or 4 series of scales on the cheek.

\* Caudal rounded or subtruncate.

D. XVI 10; A. III 9; Sc. 32  $\frac{3\frac{1}{2}}{11}$ ; pectoral [p. 409.]  
not extending to vertical or origin of anal . 24. *P. multiocellatus*, Blgr.,

D. XV 11; A. III 8; Sc. 32  $\frac{3\frac{1}{2}}{10}$ ; pectoral  
extending to vertical of origin of anal . . 25. *P. darlingi*, Blgr., p. 410.

\*\* Caudal truncate.

- D. XV-XVI 8-10; A. III 8-10; Sc. 30-  
33  $\frac{5}{11-13}$ ; pectoral extending to vertical of  
origin of anal. . . . . 26. *P. riponianus*, Blgr., p. 411.

b. Lower jaw not projecting; pectoral at least as long as head; caudal truncate or feebly emarginate.

- D. XV 9; A. III 8; Sc. 32  $\frac{4-5}{11}$ ; 3 series of  
scales on the cheek; depth of body 3 times  
in total length . . . . . 27. *P. microdon*, Blgr., p. 412.

- D. XV 9; A. III 8-9; Sc. 32  $\frac{4-5}{13}$ ; 3 or 4 series  
of scales on the cheek; depth of body 2 to  
 $2\frac{1}{2}$  times in total length . . . . . 28. *P. obesus*, Blgr., p. 414.

- D. XV-XVII 9-10; A. III 8; Sc. 33-37  $\frac{3-4}{9-10}$ ;  
4 or 5 series of scales on the cheek; depth  
of body 3 to  $3\frac{1}{2}$  times in total length . . . 29. *P. auritus*, Blgr., p. 415.

c. Lower jaw projecting in the adult; pectoral  $\frac{3}{5}$  to  $\frac{5}{6}$  length of head;  
caudal rounded.

- D. XV-XVI 8-10; A. III 8-10; Sc. 30-  
34  $\frac{4-6}{12-14}$ ; 3 to 5 series of scales on the  
cheek . . . . . 30. *P. speki*, Blgr., p. 416.

- D. XV 9; A. III 8; Sc. 31  $\frac{7}{12}$ ; 6 series of  
scales on the cheek . . . . . 31. *P. flavipinnis*, Blgr., p. 418.

- D. XV-XVI 8-10; A. III 8-9; Sc. 37-  
45  $\frac{6-8}{15-16}$ ; 5 or 6 series of scales on the  
cheek . . . . . 32. *P. cavifrons*, Hilg., p. 419.

2. Caudal rounded; dorsal with 18 or 19 spines.

- D. XVIII-XIX 8-9; A. III 7-8; Sc. 34-  
36  $\frac{4\frac{1}{2}-5}{20-23}$ ; pectoral as long as or longer than  
the head . . . . . 33. *P. frontosus*, Blgr., p. 420.

3. Caudal deeply emarginate; dorsal with 12 to 16 spines; eye very large;  
2 or 3 series of scales on the cheek.

- D. XV-XVI 10-13; A. III 6-7; Sc. 33-  
38  $\frac{3\frac{1}{2}-4\frac{1}{2}}{10-11}$ ; 60 to 70 teeth in outer series of  
upper jaw . . . . . 34. *P. macrops*, Blgr., p. 421.

- D. XII-XIV 12-13; A. III 8-9; Sc. 34-  
38  $\frac{2\frac{1}{2}-3}{11-12}$ ; 64 to 80 teeth in outer series of  
upper jaw; maxillary not reaching vertical  
of anterior border of eye . . . . . 35. *P. stappersii*, Blgr., p. 423.

D. XII-XIII 12-13; A. III 7-8; Sc. 32-

35  $\frac{2\frac{1}{2}}{10}$ ; 50 to 60 teeth in outer series of upper jaw. . . . . 36. *P. pleurospilus*, Blgr., [p. 423.

D. XIII 12-14; A. III 6-8; Sc. 32-35  $\frac{3\frac{1}{2}}{10-11}$ ; . . . . . [p. 424.

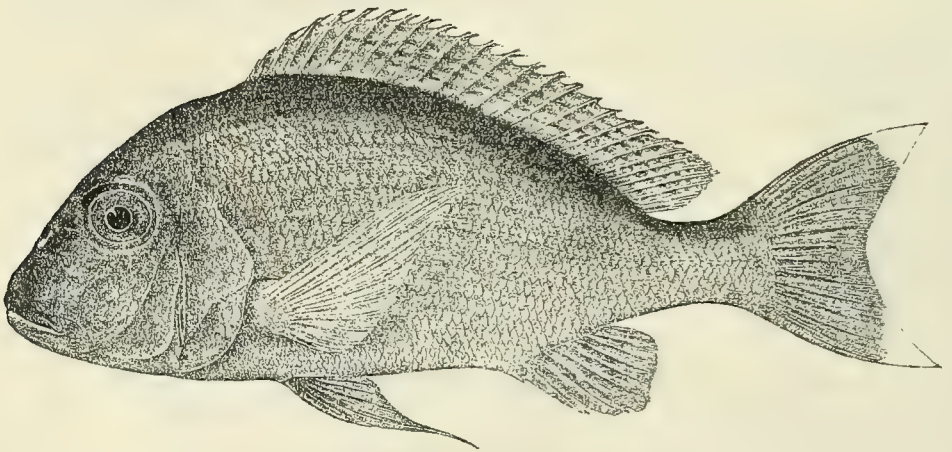
40 to 50 teeth in outer series of upper jaw . 37. *P. rhodostigma*, Blgr.,

### 1. PELMATOCHROMIS POLYLEPIS.

Bouleng. Ann. Mus. Congo, Zool. i. p. 143, pl. lii. fig. 1 (1900), and Poiss. Bass. Congo, p. 433 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 277; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 566, pl. xxxvii. fig. 2.

Depth of body  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times in total length, length of head 3 to  $3\frac{1}{3}$  times. Head  $1\frac{2}{3}$  to 2 times as long as broad; snout with straight or convex upper profile, as long as broad or a little longer than broad,

Fig. 258.



*Pelmatochromis polylepis*.

Type (A. M. C.).  $\frac{1}{2}$ .

1 (young) to  $1\frac{2}{3}$  times as long as eye, which is 3 to 4 times in length of head, 1 to  $1\frac{1}{3}$  times in interorbital width, and equals or exceeds pre-orbital depth; mouth rather small, extending to between vertical of nostril and eye; teeth small, in 4 or 5 series, 40 to 50 in outer series of upper jaw. 4 or 5 series of scales on the cheek, width of scaly part a little less than diameter of eye. Gill-rakers short, broad, tubercular, 12 to 15 on lower part of anterior arch. Dorsal XV-XVI 13-15; spines moderately strong, subequal from the sixth or seventh, which

measures  $\frac{1}{3}$  to  $\frac{2}{7}$  length of head (in young, third to fifth spines longest,  $\frac{1}{2}$  length of head); longest soft rays  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Anal III 8; spines very strong, third  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Pectoral as long as or a little longer than head, reaching origin of anal. Ventral produced into a filament, reaching vent. Caudal scaly, rather deeply emarginate. Caudal peduncle longer than deep. Scales cycloid or feebly denticulate, 55-67  $\frac{6-8}{16-19}$ ; lateral lines  $\frac{25-33}{41-48}$ , the lower extending far forward.

Golden, greyish brown, or olive-brown above, with or without 5 or 6 more or less distinct darker bars on the body; dorsal, and sometimes also anal and caudal, with reddish or purplish brown streaks or a wide-meshed network.

Total length 300 millim.

Lake Tanganyika.—Types in Congo Museum, Tervueren.

1-2. Types.	Kinyamkolo.	Prof. J. E. S. Moore (C.).
3. Type.	Kibwesi.	"
4-5. Ad. & yg.	Mtondwe Bay.	Dr. W. A. Cunningham (C.).
6. Ad.	Niamkolo.	"
7-8. Hgr. & yg.	Mouth of Little Rusisi R.	Dr. L. Stappers (C.).
9-10. Ad. & yg.	Vua Bay.	"

## 2. PELMATOCHROMIS JENTINKI.

*Paratilapia (Pelmatochromis) jentinkii*, Steind. Notes Leyd. Mus. xvi. 1894, p. 43, pl. ii. fig. 1.

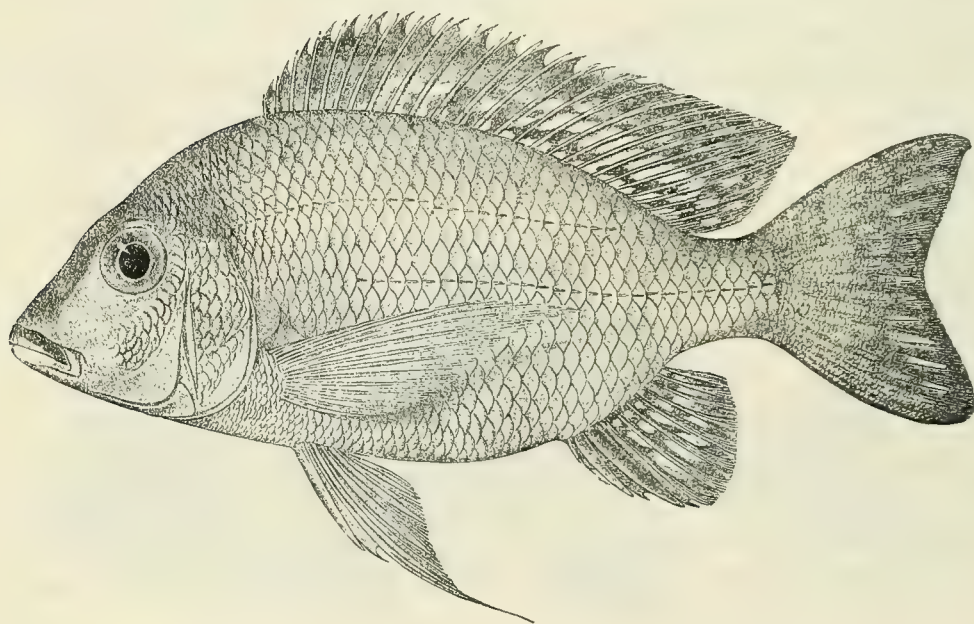
*Pelmatochromis jentinki*, Bouleng. Proc. Zool. Soc. 1898, p. 148, and 1900, p. 516; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 277, and Ann. Instit. Océanogr. vi. 4, 1914, p. 59, pl. ii. fig. 1.

Depth of body  $2\frac{1}{4}$  to  $2\frac{2}{5}$  times in total length, length of head 3 to  $3\frac{1}{3}$  times. Head nearly twice as long as broad; snout rounded, with convex upper profile, as long as broad, as long as or longer than eye, which is  $2\frac{4}{5}$  to  $3\frac{1}{2}$  times in length of head, 1 to  $1\frac{1}{3}$  times in interorbital width, and equals or exceeds præorbital depth; mouth rather small, extending to between vertical of nostril and eye; teeth small, in 2 to 4 series, 40 to 50 in outer series of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part much less than diameter of eye. Gill-rakers short, broad, tubercular, 12 to 15 on lower part of anterior arch. Dorsal XIII-XV 16-17; spines rather slender, rapidly increasing in length in front and slightly behind, last about  $\frac{1}{2}$  length of head; longest



soft rays about  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head. Anal III 8-9; spines much stronger than dorsals, third  $\frac{1}{2}$  to slightly more than  $\frac{2}{3}$  length of head. Pectoral  $1\frac{1}{4}$  to  $1\frac{1}{3}$  times as long as head, reaching origin of anal. Ventral produced into a filament, extending beyond origin of anal. Caudal scaly, distinctly emarginate. Caudal peduncle as long as deep. Scales cycloid or very indistinctly denticulate, 40-45  $\frac{5-6}{3}$ ; lateral lines  $\frac{28-35}{26-36}$ , the lower extending far forward, sometimes nearly to above the axil. Golden; dorsal and anal with straight or oblique purplish streaks, which may form

Fig. 259.

*Pelmatochromis jentinkii.*Bafata.  $\frac{1}{2}$ .

a wide-meshed network; caudal white, edged with blackish in the young, with a purplish network in the adult.

Total length 290 millim.

Gambia to Liberia.—Type in Leyden Museum.

- |                 |                                       |                           |
|-----------------|---------------------------------------|---------------------------|
| 1-2. Hgr. & yg. | Gambia.                               | J. S. Budgett, Esq. (P.). |
| 3. Skel.        | "                                     | "                         |
| 4. Ad.          | Geba R. at Bafata, Portuguese Guinea. | Dr. W. J. Ausorge (C.).   |

## 3. PELMATOCHROMIS LATERALIS.

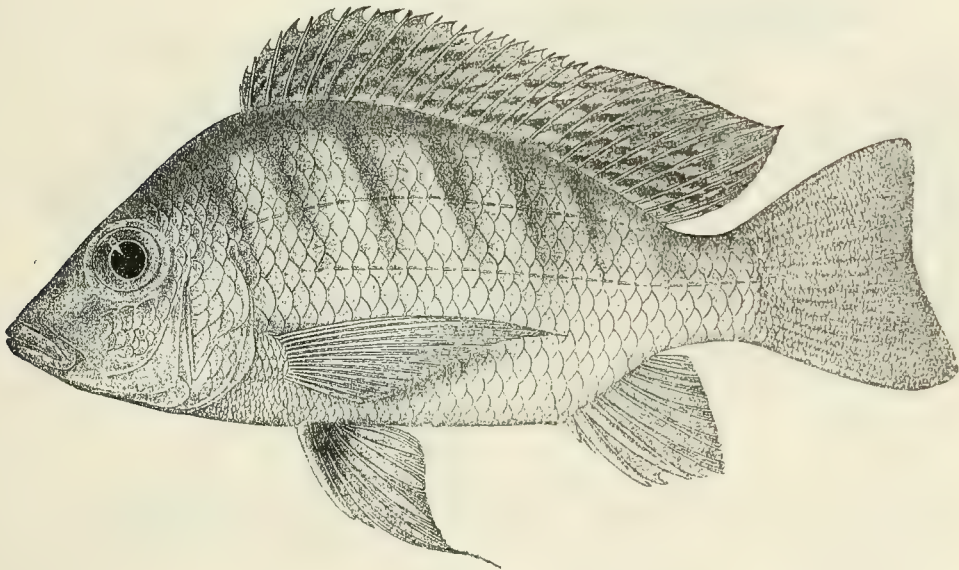
*Pelmatochromis guentheri* (non Sauv.), Bouleng. Ann. & Mag. N. H. (6) xvii. 1896, p. 310.

*Pelmatochromis lateralis*, Bouleng. Proc. Zool. Soc. 1898, p. 148, and Poiss. Bass. Congo, p. 434 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 276; Steind. Denkschr. Ak. Wien, lxxxix. 1913, p. 59.

*Pelmatochromis lepidurus*, Pellegr. Bull. Mus. Paris, 1900, p. 275.

Depth of body 2 to 3 times in total length, length of head  $2\frac{4}{5}$  to  $3\frac{1}{4}$  times. Head 2 to  $2\frac{1}{2}$  times as long as broad; snout rounded, with straight or slightly convex upper profile, 1 (young) to  $1\frac{3}{4}$  times as long as eye, which is  $3\frac{1}{4}$  to 4 times in length of head, 1 to  $1\frac{1}{2}$  times in

Fig. 260.



*Pelmatochromis lateralis*.

Bolobo,  $\frac{2}{3}$ .

interorbital width and equal to or a little less than præorbital depth in the adult; mouth rather small, extending to below nostril or between nostril and eye; teeth small, in 3 to 5 series, 40 to 50 in outer series of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, broad, tubercular, 15 to 17 on lower part of anterior arch. Dorsal XIV–XVI 12–14; spines rather strong, subequal from the fifth or increasing in length to the last, last  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{4}$  length of head. Anal III 7–8; spines much stronger than dorsals, third  $\frac{1}{2}$  to  $\frac{3}{5}$

length of head. Pectoral as long as or a little longer or a little shorter than head, sometimes reaching anal. Ventral produced into a filament, extending to origin of anal or a little beyond. Caudal scaly, truncate or feebly emarginate. Caudal peduncle as long as deep. Scales cycloid,  $31-36 \frac{4-5}{2}$ ; lateral lines  $\frac{21-27}{25-31}$ , the lower extending far forward, sometimes nearly to above the axil. Coloration very variable. Golden yellow to olive, with or without dark spots forming lines along the series of scales, or 7 or 8 dark transverse bars; sides of head sometimes marbled or vermiculate with blackish; dorsal and caudal uniform or spotted, marbled, or streaked with blackish or with large white spots separated by an olive network; dorsal sometimes edged with orange or black.

Total length 280 millim.

Congo, Lakes Bangwelu and Mweru.

1. Yg., type.	Monsembe, Upper Congo.	Rev. J. H. Weeks (P.).
2-3. Ad.	" "	"
4. Ad.	Bolobo, "	Rev. G. Grenfell (P.).
5. Ad.	Maluku, Stanley Pool.	Dr. C. Christy (C.).
6. Hgr.	Dolo, "	M. P. Delhez (C.)
7-10. Hgr. & yg.	Bikoro, L. Tumba.	"
11-12. Ad. & hgr.	Ibali, L. Leopold II.	"
13. Skel.	" "	"
14-15. Ad. & yg.	New Antwerp, Upper Congo.	Capt. Wilverth (C.).
16. Hgr.	Stanley Falls.	Dr. C. Christy (C.).
17. Yg.	Banzville, Ubanghi.	Capt. Royaux (C.).
18-19, 20-21. Ad. & hgr.	L. Bangwelu.	F. H. Melland, Esq. (P.).
22. Skel.	" "	"
23-24. Ad. & hgr.	L. Mweru at Lukonzolwa.	Dr. L. Stappers (C.).
25. Ad.	Luapula R. at Kasenge.	"

#### 4. PELMATOCHROMIS CONGICUS.

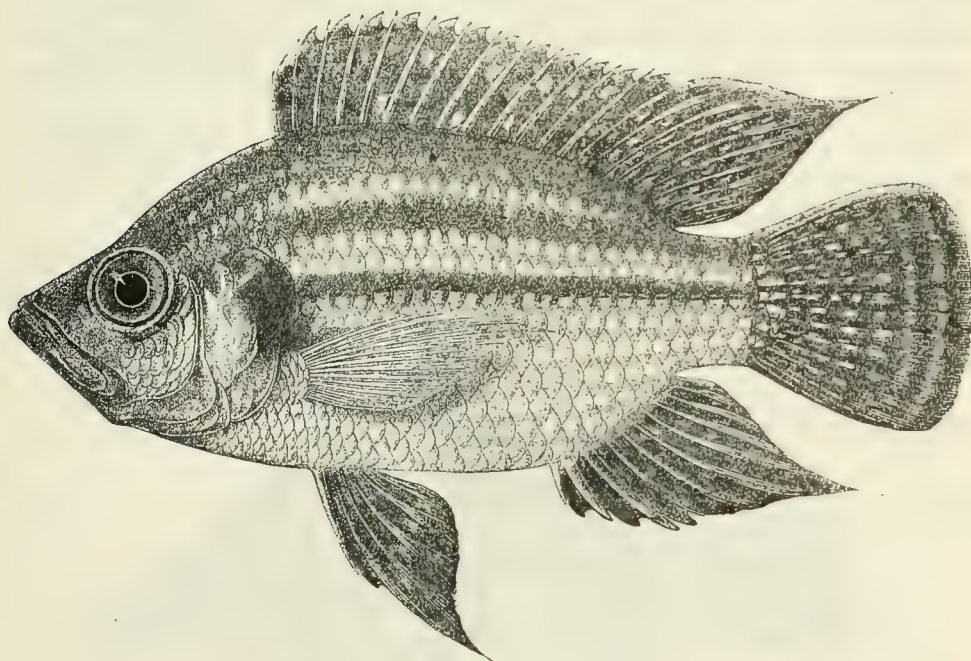
Bouleng. Ann. & Mag. N. H. (6) xx. 1897, p. 422, Proc. Zool. Soc. 1898, p. 149, and Poiss. Bass. Congo, p. 436 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 287.

Depth of body 2 to  $2\frac{1}{4}$  times in total length, length of head  $2\frac{1}{2}$  to  $2\frac{3}{4}$  times. Head twice as long as broad, with concave upper profile; snout



rounded, as long as broad, as long as eye, which is 3 to  $3\frac{2}{3}$  times in length of head, equals or a little exceeds interorbital width, and much exceeds præorbital depth; mouth large, extending to below anterior third of eye; teeth small, in 3 series, 52 to 60 in outer row of upper jaw; 4 series of scales on the cheek, width of scaly part equal to or a little less than diameter of eye. Gill-rakers long and slender, 18 to 20 on lower part of anterior arch. Dorsal XIII 11; spines subequal from

Fig. 261.

*Pelmatochromis congicus.*Type.  $\frac{3}{4}$ .

the fifth or sixth, nearly half length of head; median soft rays produced into filaments, longest a little longer than head. Anal III 8-9; third spine nearly as long as and much stronger than longest dorsal. Pectoral as long as head, extending to above origin of anal. Ventral prolonged into a filament, reaching origin of anal or a little beyond. Caudal peduncle deeper than long. Scales cycloid, 28-30  $\frac{4}{11}$ ; lateral lines  $\frac{18-21}{10-13}$ . Olive, the centres of the scales yellowish; a large black opercular spot; two rather indistinct dark lateral streaks; vertical fins blackish, with round



yellowish spots, which may be confluent into transverse bars on the posterior part of the caudal.

Total length 175 millim.

Upper Congo.

- |          |                |                          |
|----------|----------------|--------------------------|
| 1. Type. | Stanley Falls. | Rev. W. H. Bentley (C.). |
| 2. Ad.   | Monsembe.      | Rev. J. H. Weeks (P.).   |

##### 5. PELMATOCHROMIS GUENTHERI.

*Hemichromis guentheri*, Sauv. Bull. Soc. Zool. France, 1882, p. 317, pl. v. fig. 1.

*Hemichromis volta*, Steind. Sitzb. Ak. Wien, xvi. i. 1887, p. 60, pl. i. fig. 3.

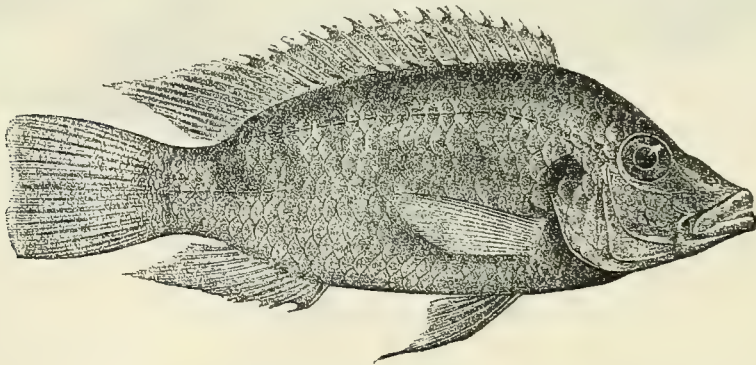
*Pelmatochromis guentheri*, Bouleng. Proc. Zool. Soc. 1898, p. 150 ; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 279, and Bull. Soc. Philom. (10) i. 1909, p. 52.

*Hemichromis tersquamatus*, Günth. Proc. Zool. Soc. 1899, p. 717, pl. xlii. fig. B.

*Pelmatochromis pellegrini*, Bouleng. Proc. Zool. Soc. 1902, ii. p. 328, pl. xxix. fig. 2 ; Pellegr. t. c. p. 280.

Depth of body  $2\frac{1}{5}$  to  $2\frac{2}{3}$  times in total length, length of head  $2\frac{2}{3}$  to  $2\frac{4}{5}$  times. Head twice or a little over twice as long as broad ; snout

Fig. 262.



*Pelmatochromis guentheri*.

Type of *P. tersquamatus*, after Günther (P. Z. S. 1899).  $\frac{3}{4}$ .

obtusely pointed, with straight or slightly convex upper profile, as long as broad, 1 (young) to 2 times as long as eye, which is 3 (young) to  $4\frac{1}{2}$  times in length of head, 1 to  $1\frac{1}{2}$  times in interorbital width or præorbital depth ; mouth moderate, extending to between nostril and eye ; 2 to 4 series of teeth in each jaw, outer rather large, 40 to 60 in outer series of upper jaw ; 4 or 5 (rarely 3) series of scales on the cheek, width of scaly part equal to or a little less than diameter of eye. Gill-rakers short and

broad, tubercular, 12 to 15 on lower part of anterior arch. Dorsal XV–XVII 9–12; spines subequal from the sixth, or increasing in length to the last, which measures  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head; median soft rays more or less produced,  $\frac{2}{3}$  to once length of head. Anal III 7–8; third spine as long as or a little shorter than last dorsal. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not reaching origin of anal. Ventral reaching vent. Caudal rounded or rounded-subtruncate. Caudal peduncle as long as deep or a little deeper than long. Scales cycloid, 28–30  $\frac{2\frac{1}{2}}{9-10}$ ; lateral lines  $\frac{19-22}{7-12}$ . Olive-brown above, yellowish beneath; a black opercular spot, sometimes followed by a rather indistinct dark band extending to the root of the caudal; fins grey, spinous dorsal sometimes with a series of round black spots near the base, dorsal and upper part of caudal sometimes edged with black.

Total length 160 millim.

Gold Coast to Gaboon.—Type in Paris Museum.

1. Type of <i>H. tersquamatus</i> .	Kotchwah R., Gold Coast.	R. B. N. Walker, Esq. (P.).
2. Hgr.	Akropon, Gold Coast.	R. B. N. Walker, Esq. (C.); Dr. A. Günther (P.).
3. Hgr.	Odumasi, „	„ „
4–7. Ad., hgr., & yg.	Tano R., „	Dr. H. G. F. Spurrell (P.).
8–10. Ad. & hgr.	Near Dunkwa, Gold Coast.	„
11. Ad.	Atijéré, E. of Lagos.	Major G. E. Bruce (P.).
12. Ad.	Oyan R., Niger.	A. E. Kitson, Esq. (P.).
13–14. Ad. & hgr.	Deert, Mouth of Gurara R., Niger.	J. J. Simpson, Esq. (P.).
15–17. Ad. & yg.	Kwale, Ethiop R., Lower Niger.	Capt. R. D. Gard'ner (P.).
18–20. Hgr. & yg.	Oji R., Lower Niger.	Major G. E. Bruce (P.).
21–23. Types of <i>P. pellegrini</i> .	Sapelle, Lower Niger.	Dr. W. J. Ansorge (C.).
24. Yg.	Ossomari, „	„
25. Hgr.	Lower Niger.	Mr. J. Paul Arnold (P.).
26. Ad.	Kribi R., S. Cameroon.	G. L. Bates, Esq. (C.).
27. Skel.	„ „	„
28–29. Ad.	Benito R., Spanish Guinea.	„

## 6. PELMATOCHROMIS REGANI.

Pellegr. Bull. Mus. Paris, 1906, p. 471, and Bull. Soc. Philom. (9) ix. 1907, p. 36, pl. i. fig. 4.

Depth of body nearly equal to length of head,  $2\frac{2}{3}$  times in total length. Snout with straight upper profile, a little more than twice as long as eye, which is  $4\frac{1}{2}$  times in length of head and  $1\frac{1}{3}$  times in interorbital width; mouth extending to between nostril and eye; teeth in 6 or 7 series; 4 series of scales on the cheek. Gill-rakers short and broad, 14 on lower part of anterior arch. Dorsal XIV 11; last spine longest,  $\frac{1}{3}$  length of head. Anal III 7. Pectoral about  $\frac{2}{3}$  length of head, not reaching anal. Ventral extending beyond vent. Caudal rounded. Caudal peduncle slightly deeper than long. Scales  $28\frac{3\frac{1}{2}}{10}$ ; lateral lines  $\frac{19}{10}$ . Olive-brown above, yellowish beneath, with traces of 5 or 6 darker bars; vertical fins greyish, soft dorsal and caudal with series of small light spots.

Total length 165 millim.

Ogowe.—Type in Paris Museum.

## 7. PELMATOCHROMIS BUETTIKOFERI.

*Paratilapia* (*Pelmatochromis*) *büttikoferi*, Steind. Notes Leyd. Mus. xvi. 1894 p. 40.

*Pelmatochromis buettikoferi*, Bouleng. Proc. Zool. Soc. 1898, p. 147; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 286 (part.).

Depth of body 2 to  $2\frac{1}{3}$  times in total length, length of head  $2\frac{2}{3}$  to 3 times. Head nearly twice as long as broad; snout rounded, with straight or slightly convex upper profile, a little broader than long, as long as or a little longer than the eye, which is 3 to  $3\frac{1}{2}$  times in length of head, equals interorbital width, and exceeds præorbital depth; mouth moderately large, extending to below anterior border of eye; teeth in 4 to 7 series, 44 to 54 in outer series of upper jaw; 3 series of scales on the cheek, width of scaly part not exceeding diameter of eye. Gill-rakers short, 8 or 9 on lower part of anterior arch. Dorsal XIV–XV 10–12; spines subequal from the 5th or 6th,  $2\frac{1}{3}$  to  $2\frac{3}{5}$  times in length of head; middle soft rays more or less produced, nearly as long as head in adult. Anal III 8; third spine as long as or a little shorter than longest dorsal. Pectoral as long as or a little shorter than head, nearly reaching origin of anal. Ventral produced into a filament, reaching beyond origin of anal in adult. Caudal truncate or slightly emarginate.



Caudal peduncle deeper than long. Scales cycloid, 27-29  $\frac{21-3}{10-11}$ ; lateral lines  $\frac{18-19}{8-11}$ . Brownish, with 4 or 5 rather indistinct darker bars and a black opercular spot; a dark spot below the base of the dorsal between the spinous and soft portions; soft dorsal with small light spots.

Total length 130 millim.

Liberia.—Type, in Leyden Museum, examined.

1-2. Ad. & hgr.

Nanna Kru.

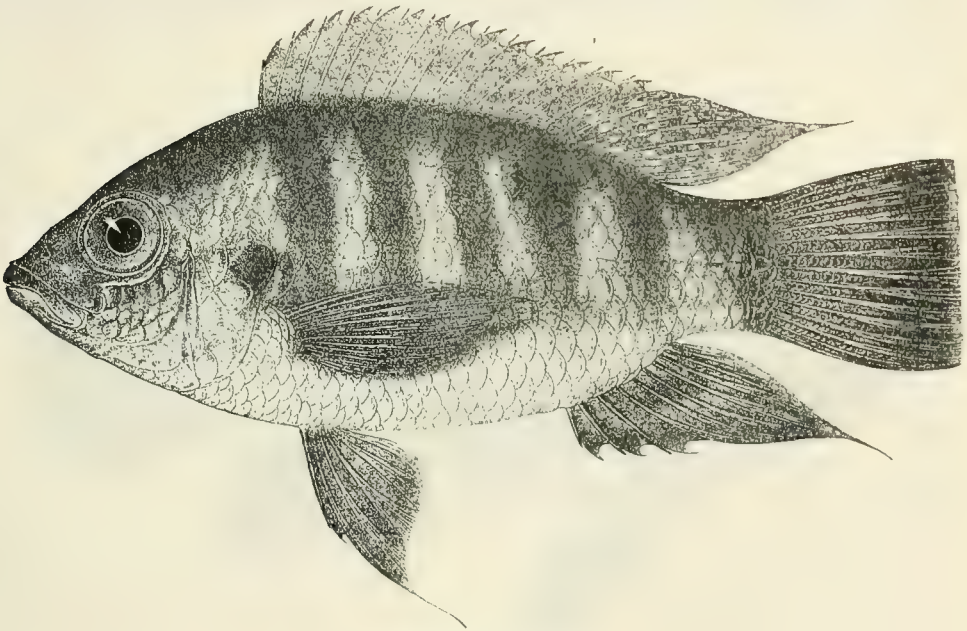
W. P. Lowe, Esq. (C.).

3, 4. Skel.

„

„

Fig. 263.



*Pelmatochromis buettikoferi*.

Nanna Kru.

#### 8. PELMATOCHROMIS OCELLIFER.

Bouleng. Proc. Zool. Soc. 1899, p. 104, and Poiss. Bass. Congo. p. 437 (1901);  
Steind. Denkschr. Ak. Wien, lxxxix. 1913, p. 58, fig.

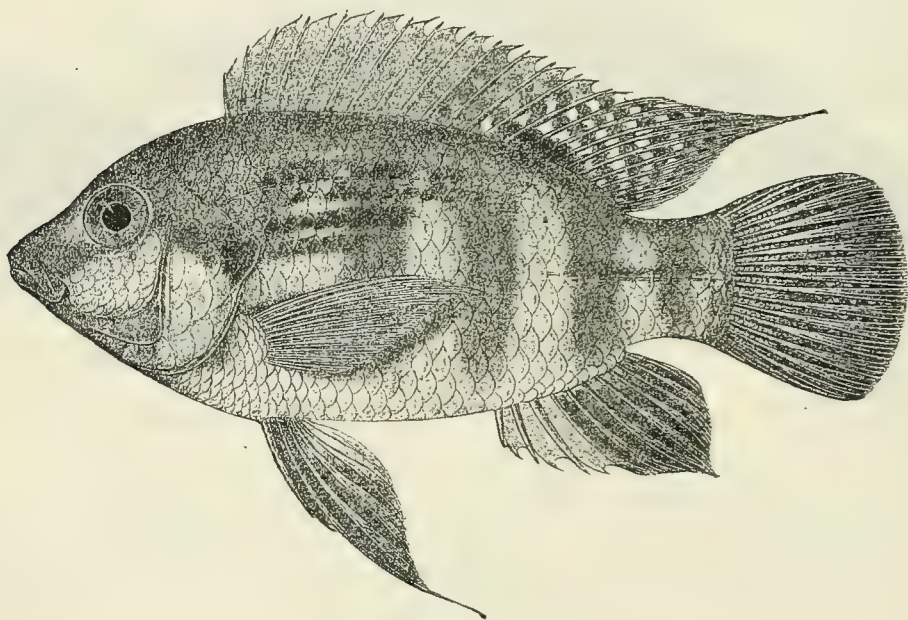
*Pelmatochromis buettikoferi*, part., Pellegr. Mém. Soc. Zool. France, xvi. 1904,  
p. 286.

Depth of body  $2\frac{1}{4}$  to  $2\frac{1}{3}$  times in total length, length of head  $2\frac{2}{3}$  to  $2\frac{3}{4}$  times. Head nearly twice as long as broad; snout rounded, with straight or slightly concave upper profile, a little broader than long, as long as or a little longer than diameter of eye, which is  $3\frac{1}{2}$  to  $4\frac{1}{2}$  times in length of head, equals interorbital width, and exceeds præorbital depth; mouth moderately large, extending to below anterior border of



eye, or not quite so far; teeth in 3 to 5 series, 44 to 52 in outer series of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part equal to or a little less than diameter of eye. Gill-rakers short, 7 on lower part of anterior arch. Dorsal XIV-XV 10-12; spines subequal from the fifth, or increasing in length to the last, which measures about  $\frac{1}{2}$  length of head; middle soft rays produced, as long as head or a little longer. Anal III 8-9; third spine shorter than longest dorsal. Pectoral  $\frac{3}{4}$  to nearly once length of head, nearly reaching origin of anal. Ventral produced into a filament, reaching beyond origin of anal in adult. Caudal rounded. Caudal peduncle deeper than long. Scales cycloid,

Fig. 264.

*Pelmatochromis ocellifer.*

Monsembe.

27-29  $\frac{2\frac{1}{2}-3}{10-11}$ ; lateral lines  $\frac{17-19}{8-11}$ . Brownish with five rather indistinct dark bars, which may be replaced by a series of dark blotches on the side; a black opercular spot; a dark, sometimes light-edged spot at the base of the dorsal, between the spinous and soft portions; soft dorsal with light spots.

Total length 130 millim.

Upper Congo.

1. Type.

Monsembe.

Rev. J. H. Weeks (P.).

2. Ad.

„

„

## 9. PELMATOCHROMIS NIGROFASCIATUS.

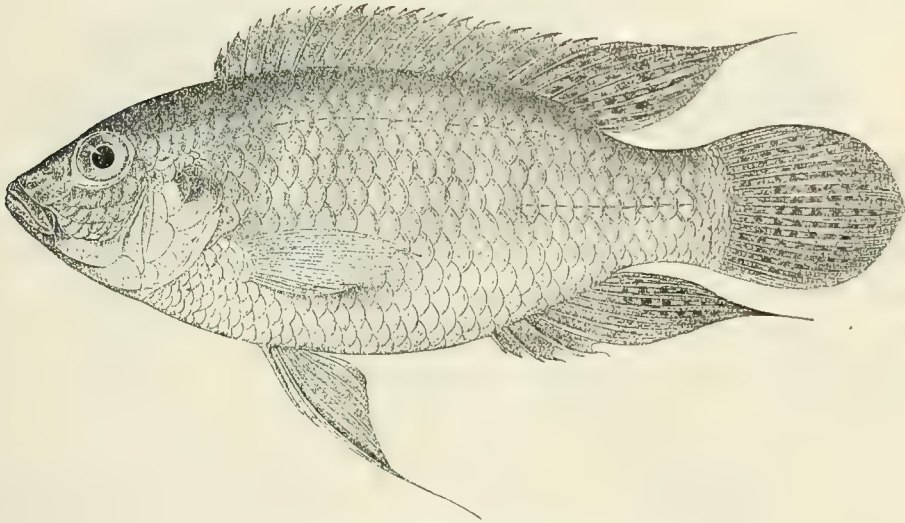
*Paratilapia nigrofasciata*, Pellegr. Bull. Mus. Paris, 1900, p. 353 ; Bouleng. Poiss. Bass. Congo, p. 421 (1901) ; Steind. Denkschr. Ak. Wien, lxxxix. 1913, p. 54.

*Pelmatochromis batesii*, Bouleng. Ann. & Mag. N. H. (7) viii. 1901, p. 114.

*Pelmatochromis nigrofasciatus*, Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 280, pl. vi. fig. 2, and Bull. Soc. Philom. (9) ix. 1907, p. 37.

Depth of body  $2\frac{1}{2}$  to 3 times in total length, length of head  $2\frac{3}{4}$  to 3 times. Head twice as long as broad ; snout rounded, with straight or slightly convex upper profile, as long as broad,  $1\frac{1}{4}$  to  $1\frac{1}{2}$  times as long as eye, which is  $3\frac{1}{2}$  to 4 times in length of head, 1 to  $1\frac{1}{4}$  times in

Fig. 265.

*Pelmatochromis nigrofasciatus*.

Type of *P. batesii*.

interorbital width, and equals or slightly exceeds præorbital depth ; mouth moderately large, extending to between nostril and eye ; teeth in 3 to 5 series, outer rather large, 40 to 64 in outer series of upper jaw ; 3 or 4 series of scales on the cheek, width of scaly part equal to or a little greater than the diameter of eye. Gill-rakers short, tubercular, 10 or 11 on lower part of anterior arch. Dorsal XIV-XVI 9-11 ; spines increasing in length to the last, which measures  $\frac{1}{3}$  to  $\frac{2}{3}$  length of head ; middle soft rays more or less produced, often as long as head. Anal III 7-9 ; third spine as long as or a little shorter than longest dorsal. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not reaching origin of anal.

Ventral produced into a filament, reaching origin of anal or beyond. Caudal rounded. Caudal peduncle deeper than long. Scales cycloid, 26–28  $\frac{2\frac{1}{2}}{9-10}$ ; lateral lines  $\frac{18-20}{7-10}$ . Dark olive-brown above, yellowish beneath, often with 5 or 6 more or less distinct darker cross-bands; a bluish-black opercular spot; fins greyish, soft dorsal, anal, and caudal with small blackish spots, or with round light, dark-edged spots.

Total length 120 millim.

South Cameroon and Fernando Po to Congo.—Types in Paris Museum.

1–7, 8–15. Ad. & hgr.	Kribi R., S. Cameroon.	G. L. Bates, Esq. (C.).
16. Skel.	“	“
17. Ad.	Efulen,	“
18–20. Types of <i>P. batesii</i> .	Benito R., Spanish Guinea.	“
21–25. Ad. & yg.	Fernando Po.	Mr. E. Seimund (C.).

#### 10. PELMATOCHROMIS CAUDIFASCIATUS.

Bouleng. Ann. & Mag. N. H. (8) xii. 1913, p. 69.

Depth of body nearly equal to length of head, 3 to  $3\frac{1}{4}$  times in total length. Head twice as long as broad; snout rounded, with convex upper profile, a little broader than long, as long as or a little longer than eye, which is  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times in length of head, 1 to  $1\frac{1}{4}$  times in interorbital width, and a little exceeds præorbital depth; mouth moderately large, extending to between nostril and eye; teeth small, in 3 or 4 series, 40 to 60 in outer series of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part a little less than diameter of eye. Gill-rakers short, tubercular, 7 to 9 on lower part of anterior arch. Dorsal XIV–XVI 9–11; spines increasing in length to the last, which measures  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head; longest soft rays shorter than head. Anal III 7–8; third spine as long as last dorsal. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not reaching origin of anal. Ventral produced into a filament, reaching vent, origin of anal, or a little beyond. Caudal rounded. Caudal peduncle a little deeper than long. Scales cycloid, 27–29  $\frac{2-2\frac{1}{2}}{10-11}$ ; lateral lines  $\frac{18-21}{7-9}$ . Brown above, yellowish beneath; a more or less distinct dark band from the eye to the root of the caudal, crossed by 7 to 9 rather faint dark bars, which expand into round black spots where they meet the lateral band on the caudal part of the body; dorsal with round dark spots and a black and white edge; anal with round dark spots, which often form oblique bands; caudal with



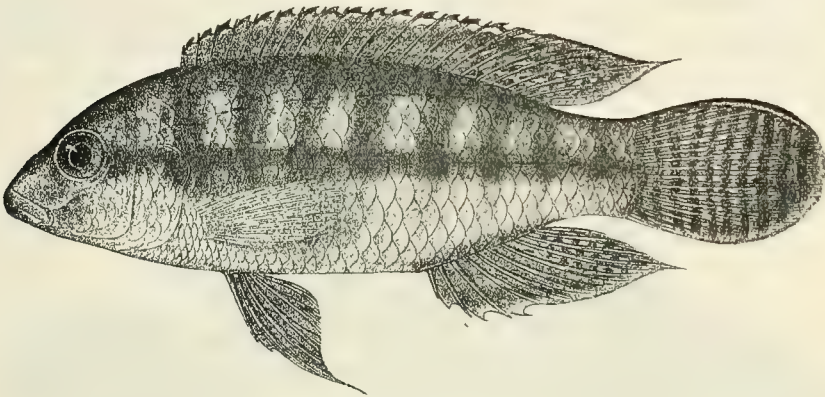
numerous dark bars, the upper rays with a black and white edge; ventrals white.

Total length 105 millim.

South Cameroon.

1-7. Types.	Nyong R.	G. L. Bates, Esq. (C.).
8-10. Types.	„ at Akonolinga.	„
11-16. Types.	Ja R. at Bitye.	„
17-18. Types.	„ at Efayong.	„
19-20. Types.	Bumbe R. at Assobam.	„

Fig. 266.



*Pelmatochromis caudifasciatus.*

Type.

#### 11. PELMATOCHROMIS LONGIROSTRIS.

Bouleng. Ann. & Mag. N. H. (7) xii. 1903, p. 411; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 281.

Depth of body equal to length of head, 3 times in total length. Head a little over twice as long as broad; snout obtusely pointed, with slightly convex upper profile, as long as broad,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as eye, which is  $3\frac{1}{4}$  to 4 times in length of head, equals or slightly exceeds interorbital width, and equals or a little exceeds præorbital depth; mouth moderately large, extending to between nostril and eye; teeth small, in 2 or 3 series, 50 to 70 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part equal to or a little less than diameter of eye. Gill-rakers short, tubercular, 9 or 10 on lower part of anterior arch. Dorsal XIV-XVI 8-10; spines increasing in length to the last, which measures  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head; middle soft rays produced, a little shorter than head. Anal III 6-7; third spine as



long as or a little longer than last dorsal. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not reaching origin of anal. Ventral produced into a filament, reaching origin of anal or beyond. Caudal rounded-subacuminate. Caudal peduncle as long as deep. Scales cycloid, 28–30  $\frac{2-2\frac{1}{2}}{8-9}$ ; lateral lines  $\frac{16-21}{8-10}$ . Yellowish or pale brown, the scales edged with darker, or with rather ill-defined dark longitudinal streaks; a more or less distinct dark horizontal streak behind the eye; vertical fins with small dark spots forming more or less regular bars, these numerous and usually very regular on the caudal fin; outer rays of ventrals white.

Total length 115 millim.

South Cameroon.

1–7. Types.

Kribi R.

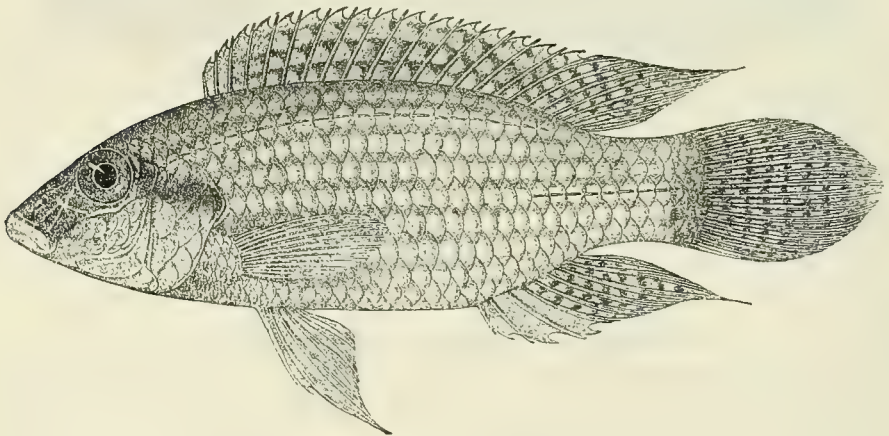
G. L. Bates, Esq. (C.).

8. Ad.

Ja R.

..

Fig. 267.



*Pelmatochromis longirostris.*

Type.

## 12. PELMATOCHROMIS BOULENGERI.

Lönnberg, Ann. & Mag. N. H. (7) xii. 1903, p. 39.

Depth of body  $2\frac{2}{3}$  to  $3\frac{2}{5}$  times in total length, length of head  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times. Snout broad, rounded, with straight upper profile,  $2\frac{1}{3}$  times as long as eye, which is  $4\frac{2}{3}$  times in length of head and nearly  $1\frac{1}{2}$  times in interorbital width; mouth extending to between nostril and eye; 4 or 5 series of teeth; 4 or 5 series of scales on the cheek. Dorsal XVI 10–11; spines increasing in length to the last, which measures  $\frac{3}{7}$  or  $\frac{2}{5}$  length of head. Anal III 7–8; third spine shorter but stouter than last dorsal.

Pectoral about  $\frac{3}{4}$  length of head. Ventral produced into a filament, not quite reaching anal. Caudal rounded. Caudal peduncle deeper than long. Scales cycloid,  $25 \frac{3}{10}$ ; lateral lines  $\frac{20}{8-10}$ . Four dusky transverse bars may be traced on the body; a black opercular spot.

Total length 140 millim.

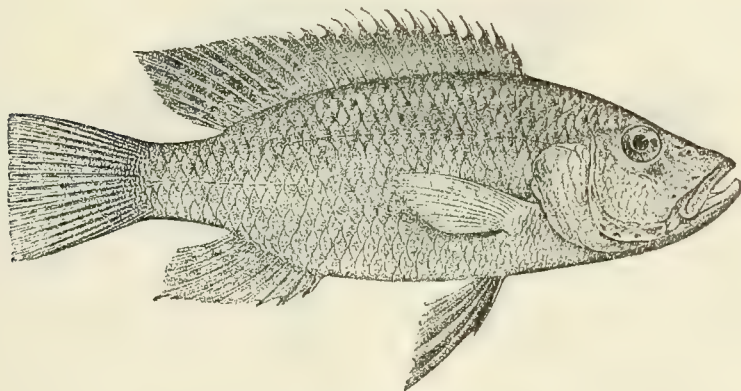
Meme River, Cameroon.—Type in Stockholm Museum.

### 13. PELMATOCHROMIS WELWITSCHII.

Bouleng. Proc. Zool. Soc. 1898, p. 149, pl. xix. fig. 1; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 717.

Depth of body equal to length of head, 3 times in total length. Head a little more than twice as long as broad; snout obtusely pointed, with straight upper profile, as long as broad, twice as long as eye, which is

Fig. 268.



*Pelmatochromis welwitschii*.

Type (P. Z. S. 1898).  $\frac{3}{4}$ .

5 times in length of head and equals interorbital width or præorbital depth; mouth moderate, extending to between nostril and eye; teeth small, in 3 series, 50 in outer series of upper jaw; 5 series of scales on the cheek, width of scaly part greater than diameter of eye. Gill-rakers short, denticulate, 9 on lower part of anterior arch. Dorsal XIV 11; spines increasing in length to the seventh, which measures  $\frac{1}{3}$  length of head and  $\frac{1}{2}$  longest soft rays. Anal III 7; third spine a little shorter than longest dorsal. Pectoral  $\frac{2}{3}$  length of head, not reaching origin of anal. Ventral not reaching vent. Caudal truncate. Caudal peduncle a little longer than deep. Scales cycloid,  $33 \frac{3\frac{1}{2}}{9}$ ; lateral lines  $\frac{21}{14}$ . Pale

brown; dorsal dark brown, whitish at the base; anal with a few round white spots; ventrals blackish.

Total length 125 millim.

Angola.

1. Type.

Fluilla.

Dr. Welwitsch (P.).

#### 14. PELMATOCHROMIS KINGSLEYÆ.

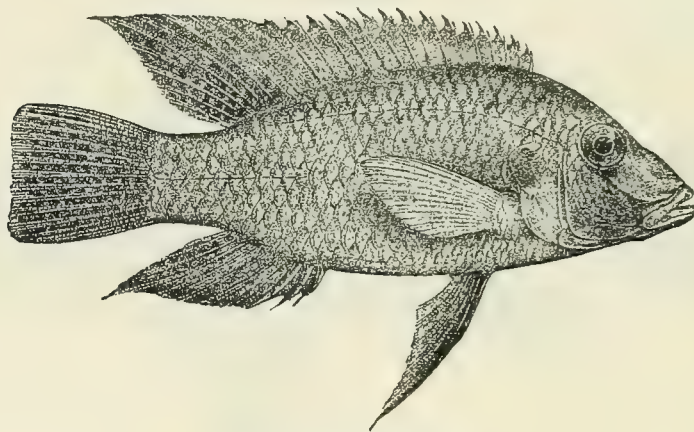
*Hemichromis schwebischi* (non Sauv.), Günth. Ann. & Mag. N. H. (6) xvii. 1896, p. 273.

*Chromidotilapia kingsleyæ*, Bouleng. Proc. Zool. Soc. 1898, p. 151, pl. xix. fig. 2; Günth. Proc. Zool. Soc. 1899, p. 718.

*Pelmatochromis kingsleyæ*, Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 278.

Depth of body  $2\frac{1}{2}$  to  $2\frac{4}{5}$  times in total length, length of head  $2\frac{2}{3}$  to 3 times. Head twice or a little over twice as long as broad; snout

Fig. 269.



*Pelmatochromis kingsleyæ*.

Type (P. Z. S. 1898).  $\frac{3}{4}$ .

obtusely pointed, with straight or convex upper profile, as long as broad, 1 (young) to 2 times as long as eye, which is 3 (young) to  $4\frac{1}{2}$  times in length of head, and equals or nearly equals interorbital width or præ-orbital depth; mouth moderate, extending to between nostril and eye; teeth in a single or double series, the inner, if present, short and irregular, those of the outer series rather large, 44 to 60 in the upper jaw, some with the crown bent at an angle to the shaft; 3 or 4 series of scales on the cheek, width of scaly part equal to diameter of eye or a little less. Gill-rakers short and broad, tubercular, 9 to 12 on lower part of anterior arch. Dorsal XIV–XVI 10–12; spines increasing in length to the last,



which is about  $\frac{2}{5}$  length of head; longest soft rays  $\frac{2}{3}$  to  $\frac{4}{5}$  length of head. Anal III 7-9, third spine as long as or a little shorter than last dorsal. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not reaching origin of anal. Ventral reaching vent or origin of anal. Caudal rounded or rounded-subtruncate. Caudal peduncle as long as deep or a little deeper than long. Scales cycloid, 27-30  $\frac{2\frac{1}{2}}{9-10}$ ; lateral lines  $\frac{18-21}{6-10}$ . Brownish, uniform or with rather indistinct traces of six darker cross-bars; a black opercular spot; fins greyish, dorsal and anal often blackish towards the border; soft dorsal, anal, and caudal often with regular squarish dark spots forming bars between the rays.

Total length 150 millim.

Niger to Congo.

1-2. Types.	Azuminé Creek, Opobo R., Niger Delta.	Miss Kingsley (C.).
3. Type.	Ogowe.	"
4. Type.	Kondo-Kondo, Ogowe.	"
5. Ad.	Komadekke, Goumié R., Ogowe.	Dr. W. J. Ansorge (C.).
6. Hgr.	Masoma R., L. Ogemwe, Ogowe.	"
7. Yg.	Abanga R., Ogowe.	"
8. Type.	Sette Cama, Gaboon.	
9. Type.	Gaboon.	
10-11. Hgr.	Loango R. at N'Kutu.	Dr. W. J. Ansorge (C.).
12-14. Ad. & hgr.	Luali R. at Boco Zau, Chiloango.	"
15-23. Hgr. & yg.	Luali R. at Lundo, Chiloango.	"
24. Skel.	" " "	"
25-26. Yg.	Lebuzi R. at Kuka Muno, Chiloango.	"

### 15. PELMATOCHROMIS SUBOCELLATUS.

*Hemichromis subocellatus*, Günth. Proc. Zool. Soc. 1871, p. 667, pl. lxvii. fig. C.

*Pelmatochromis subocellatus*, Bouleng. Proc. Zool. Soc. 1898, p. 150; Pellegr.

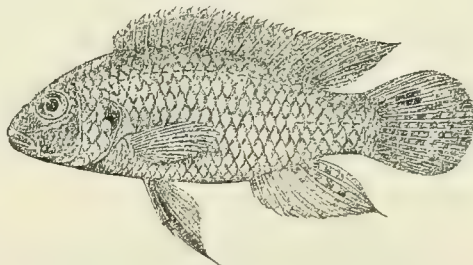
Mém. Soc. Zool. France, xvi. 1904, p. 281.

Depth of body  $2\frac{1}{2}$  to  $2\frac{3}{4}$  times in total length, length of head 3 to  $3\frac{1}{3}$  times. Head twice or not quite twice as long as broad; snout rounded, much broader than long, with convex upper profile, as long as eye, which is  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times in length of head, equals interorbital width, and exceeds præorbital depth; mouth moderate, extending to below anterior border of eye; teeth small, in 2 or 3 series, 60 to 70 in outer series of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, 9 or 10 on lower part of anterior arch. Dorsal XIV-XVI 8-10; spines subequal from the fifth or sixth,



$\frac{1}{3}$  to  $\frac{2}{5}$  length of head; longest soft rays  $\frac{2}{3}$  to  $\frac{4}{5}$  length of head. Anal III 6-8; third spine as long as or a little longer than dorsals. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not reaching origin of anal. Ventral produced or not into a filament, reaching vent or beyond origin of anal. Caudal rounded. Caudal peduncle a little deeper than long. Scales cycloid, 25-28  $\frac{2-2\frac{1}{2}}{11}$ ; lateral lines  $\frac{15-18}{5-9}$ . Brown, with a more or less distinct dark opercular spot, sometimes with a dark lateral stripe; females (with shorter ventrals) with a blackish blotch or ocellus on the soft dorsal;

Fig. 270.

*Pelmatochromis subocellatus.*

Type.

black spots, or one or several black white-edged ocelli sometimes present in the upper part of the caudal; outer edge of ventrals blackish.

Total length 75 millim.

Gaboon to Lower Congo.

1-3. Types.	Gaboon.	
4-5. Ad.	„	
6. Skel.	„	
7-11. Ad. & hgr.	Luani R. at Lundo, Chiloango.	Dr. W. J. Ansorgè (C.).
12-13. Ad. & hgr.	Luculla R., Chiloango, Belgian Congo.	„

#### 16. PELMATOCHROMIS KRIBENSIS.

Bouleng. Ann. & Mag. N. H. (8) viii. 1911, p. 373.

Depth of body 3 times in total length, length of head  $3\frac{1}{4}$  to  $3\frac{1}{3}$  times. Head twice as long as broad; snout rounded, with convex upper profile, a little broader than long, as long as eye, which is  $3\frac{1}{4}$  to  $3\frac{1}{3}$  times in length of head, equals interorbital width and exceeds præorbital depth; mouth moderate, extending to below anterior border of eye; 2 series of teeth, outer rather large, 40 to 50 in upper jaw; 3 series of scales on the cheek. Gill-rakers short, 10 or 11 on lower part of anterior arch.

Dorsal XVI–XVII 8–9; spines gradually increasing in length to the last, which measures  $\frac{1}{3}$  to  $\frac{2}{3}$  length of head; longest soft rays shorter than head. Anal III 6–7; third spine nearly  $\frac{1}{2}$  length of head. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Ventral produced into a filament, reaching vent or anal. Caudal rounded-subacuminate. Caudal peduncle a little deeper than long. Scales cycloid, 27–29  $\frac{2}{9}$ ; lateral lines  $\frac{18-20}{5-8}$ . Olive above, whitish beneath; a blackish opercular spot; sometimes an ill-defined dark lateral stripe; soft dorsal often with a round black spot behind the last spine; caudal sometimes with two black, light-edged ocellar spots above; outer edge of ventrals blackish.

Total length 65 millim.

South Cameroon.

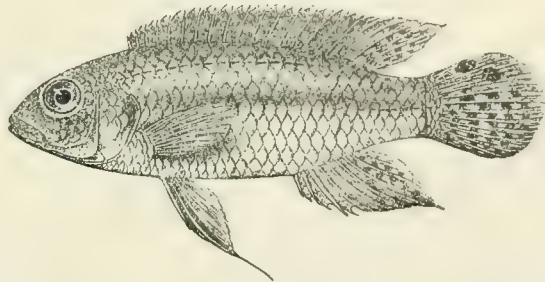
1–11. Types.

Kribi R.

G. L. Bates, Esq. (C.).

12. Skel.

Fig. 271.



*Pelmatochromis kribensis*.

Type.

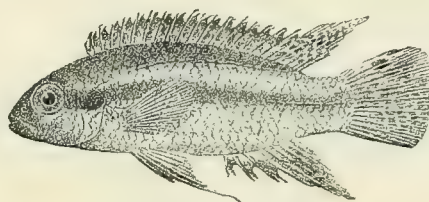
#### 17. PELMATOCHROMIS TÆNIATUS.

Bouleng. Proc. Zool. Soc. 1901, i. p. 10, pl. iv. fig. 3; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 283.

Depth of body 3 times in total length, length of head  $3\frac{1}{2}$  times. Head  $1\frac{2}{3}$  to  $1\frac{3}{4}$  times as long as broad; snout rounded, with convex upper profile, broader than long, as long as the eye, which is  $3\frac{1}{3}$  times in length of head, nearly equals interorbital width, and exceeds præ-orbital depth; mouth moderate, extending slightly beyond vertical of anterior border of eye; teeth small, in 2 or 3 series, about 60 in outer series of upper jaw; 2 series of scales on the cheek, width of scaly part much less than diameter of eye. Gill-rakers short, 11 on lower part of anterior arch. Dorsal XVII–XVIII 7–8; spines gradually increasing in length to the last, which measures  $\frac{1}{2}$  length of head; longest soft rays produced into filaments, as long as head. Anal III 7; third spine as

long as longest dorsal. Pectoral  $\frac{4}{5}$  length of head, not reaching origin of anal. Ventral produced into a filament, extending beyond origin of anal. Caudal rounded. Caudal peduncle as long as deep or a little deeper than long. Scales cycloid, 28–29  $\frac{2}{9}$ ; lateral lines  $\frac{19-21}{7-9}$ . Brownish above, yellowish beneath; two blackish longitudinal bands on each side, the upper from the occiput to the base of the soft dorsal, the lower from the eye, over the opercle, to the root of the caudal; fins greyish, ventrals white with a black outer border; oblique dark streaks

Fig. 272.

*Pelmatochromis tæniatus.*Type (P. Z. S. 1901).  $\frac{3}{4}$ .

on the soft dorsal; small blackish spots on the caudal and two larger ones edged with white on its upper border.

Total length 75 millim.

Lower Niger.

- |          |                                  |                          |
|----------|----------------------------------|--------------------------|
| 1. Type. | Mouth of Ethiop R., Niger Delta. | Dr. W. J. Ansorge (C.).  |
| 2. Ad.   | Wari, Niger Delta.               | Mr. J. Paul Arnold (P.). |

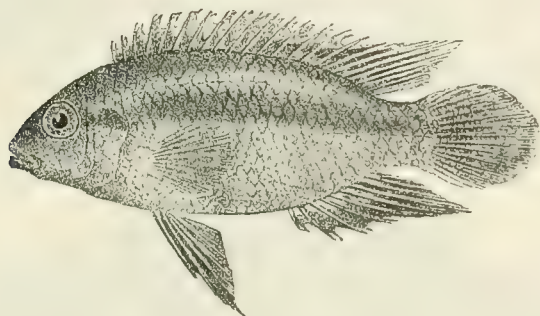
#### 18. PELMATOCHROMIS PULCHER.

Bouleng. Proc. Zool. Soc. 1901, i. p. 9, pl. iv. fig. 2; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 283.

Depth of body  $2\frac{2}{3}$  to 3 times in total length, length of head 3 to  $3\frac{1}{2}$  times. Head  $1\frac{3}{4}$  to 2 times as long as broad; snout rounded, with convex upper profile, broader than long, as long as the eye, which is 3 to  $3\frac{1}{2}$  times in length of head, a little less than interorbital width, and a little more than præorbital depth; mouth small, extending to between nostril and eye; teeth in 4 or 5 series, outer rather large, 50 to 68 in upper jaw; 2 or 3 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers short, 10 to 12 on lower part of anterior arch. Dorsal XVI 9–10; spines gradually increasing in length to the last, which measures  $\frac{1}{2}$  length of head; some of the soft rays more

or less produced, often longer than head. Anal III 7-8; third spine as long as longest dorsal. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not reaching origin of anal. Ventral more or less produced into a filament, reaching origin of anal, or a little beyond. Caudal rounded or subacuminate. Caudal peduncle as long as deep. Scales cycloid, 27-29  $\frac{2-2\frac{1}{2}}{10}$ ; lateral lines  $\frac{18-20}{8-10}$ . Olive, with two darker or blackish longitudinal bands on

Fig. 273.

*Pelmatochromis pulcher.*Type (P. Z. S. 1901).  $\frac{3}{4}$ .

each side, the upper from the occiput to the base of the soft dorsal, the lower from the eye, over the opercle, to the extremity of the caudal fin; sides of body below lower lateral band and between pectorals and ventrals of a beautiful rose-colour; spinous dorsal grey, black at the base; the black area gradually rising to cover nearly the whole of the soft dorsal; pectoral, outer side of ventral, and extremity of anal blackish; caudal grey, with an oblique white streak above in the male.

Total length 95 millim.

Lower Niger.

1-7. Types.	Mouth of Ethiop R., Niger Delta.	Dr. W. J. Ansorge (C.).
8. Ad.	Kwale, Ethiop R.	Capt. R. D. Gard'ner (P.).
9. Skel.	" "	"
10-17. Hgr. & yg.	Assay.	Dr. W. J. Ansorge (C.).
18-19. Yg.	Agberi.	"
20. Hgr.	Wari.	Mr. J. Paul Arnold (P.).
21. Ad.	Niger Delta.	"

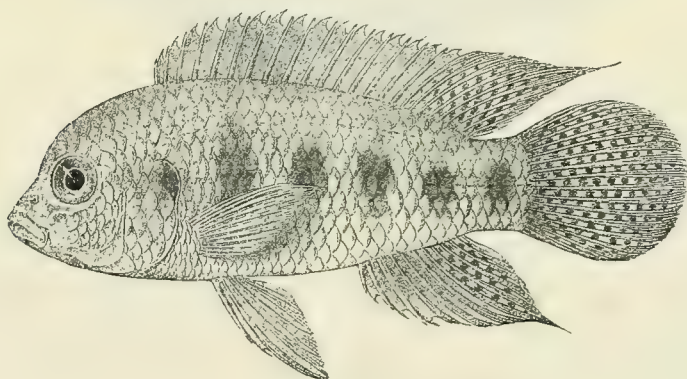


## 19. PELMATOCHROMIS ARNOLDI.

Bouleng. Ann. & Mag. N. H. (8) x. 1912, p. 263.

Depth of body  $2\frac{1}{3}$  to  $2\frac{2}{3}$  times in total length, length of head 3 times. Head  $1\frac{2}{3}$  to  $1\frac{3}{4}$  times as long as broad; snout rounded, with concave upper profile, much broader than long, as long as eye, which is  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times in length of head,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times in interorbital width, and exceeds præorbital depth; mouth moderate, extending to between nostril and eye; teeth small, in 3 series, 60 to 70 in outer series of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 9 on lower part of anterior arch. Dorsal XV-XVI 10-11, spines gradually increasing in length to the last,

Fig. 274.



*Pelmatochromis arnoldi*.

Type.

which measures nearly  $\frac{1}{2}$  length of head; median soft rays produced into filaments, as long as or a little longer than head. Anal III 8-9; third spine as long as or slightly longer than longest dorsal. Pectoral  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head, not reaching origin of anal. Ventral produced into a filament, extending beyond origin of anal. Caudal rounded. Caudal peduncle deeper than long. Scales cycloid,  $28\frac{2\frac{1}{2}-3}{10-11}$ ; lateral lines  $\frac{19}{8-9}$ . Brownish or dark olive, with five indistinct dark bars and six large, round, blackish spots on each side, the first being the opercular spot; fins greyish, soft dorsal, anal, and caudal with numerous small blackish spots.

Total length 90 millim.

Lower Niger.

1-3. Types.

Lower Niger.

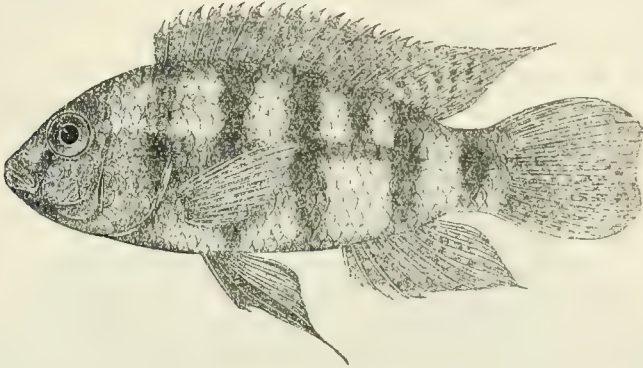
Mr. J. Paul Arnold (P.)

## 20. PELMATOCHROMIS ANNECTENS.

Bouleng. Ann. & Mag. N. H. (8) xii. 1913, p. 485 ; Arnold, Wochenschr. Aq. Terr. 1913, p. 661, fig. 1.

Depth of body  $2\frac{3}{5}$  to  $2\frac{3}{4}$  times in total length, length of head  $2\frac{4}{5}$  times. Head twice as long as broad ; snout rounded, with convex upper profile, broader than long, as long as eye, which is  $3\frac{1}{2}$  times in length of head, equals interorbital width, and exceeds præorbital depth ; mouth moderate, extending to between nostril and eye ; teeth in 3 or 4 series, outer rather large, 50 to 66 in upper jaw ; 3 or 4 series of scales on the cheek, width of scaly part a little less than diameter of eye. Gill-rakers short, 9 or 10 on lower part of anterior arch. Dorsal XV 9-10 ;

Fig. 275.

*Pelmatochromis annectens.*

Type.

spines gradually increasing in length to the last, which measures nearly  $\frac{1}{2}$  length of head ; median soft rays produced, as long as head. Anal III 7-8 ; third spine a little shorter than last dorsal. Pectoral  $\frac{3}{4}$  length of head, not reaching vertical of origin of anal. Ventral reaching origin of anal or beyond. Caudal rounded. Caudal peduncle deeper than long. Scales cycloid, 28-29  $\frac{2\frac{1}{2}}{10-11}$  ; lateral lines  $\frac{18-19}{9-10}$ . Dark brown, with four blackish vertical bars on the side ; blackish spots may be present on the back, alternating with the bars ; a black opercular spot ; fins dark grey, posterior part of dorsal and anal, and greater part of caudal with numerous small dark and light spots.

Total length 85 millim.

Lower Niger.

1-2. Types.

Lower Niger.

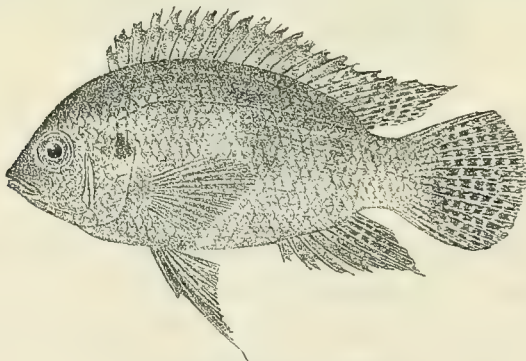
Mr. J. Paul Arnold (P.).

## 21. PELMATOCHROMIS ANSORGII.

Bouleng. Proc. Zool. Soc. 1901, i. p. 8, pl. iv. fig. 1 ; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 282.

Depth of body  $2\frac{1}{5}$  to  $2\frac{2}{5}$  times in total length, length of head  $2\frac{3}{4}$  to 3 times. Head  $1\frac{2}{3}$  to  $1\frac{3}{4}$  times as long as broad; snout rounded, with straight or slightly convex upper profile, broader than long, as long as eye, which is  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times in length of head,  $1\frac{1}{3}$  times in inter-orbital width, and exceeds præorbital depth; mouth moderate, not extending to below anterior border of eye; teeth small, in 2 to 4 series, 44 to 56 in outer series of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers short, 10 or 11 on lower part of anterior arch. Dorsal XV-XVI 10-11; spines subequal or last slightly longer, not quite  $\frac{1}{2}$  length of head; middle soft rays produced,  $\frac{3}{4}$  to once length of head. Anal III 8; third spine as long as dorsals. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not reaching origin of anal. Ventral produced into a filament, reaching origin of anal or beyond. Caudal rounded. Caudal peduncle much deeper than

Fig. 276.

*Pelmatochromis ansorgii.*

P. Z. S. 1901.  $\frac{3}{4}$ .

long. Scales cycloid,  $27-29\frac{2\frac{1}{2}-3}{10}$ ; lateral lines  $\frac{17-19}{6-8}$ . Dark olive-brown above, yellowish beneath; a blackish opercular spot; three or four vertically elongate large dark spots on each side of the body, below the upper lateral line; fins greyish, soft dorsal, anal, and caudal chequered with small darker and lighter spots.

Total length 90 millim.

Lower Niger.



1-4. Types.	Mouth of Ethiop R.	Dr. W. J. Ansorge (C.).
5. Ad.	Kwale, Ethiop R.	Capt. R. D. Gard'ner (P.).
6. Ad.	Abo.	Dr. W. J. Ansorge (C.).
7. Ad.	Assay.	„

## 22. PELMATOCHROMIS MULTIDENS.

*Paratilapia multidens*, Pellegr. Bull. Mus. Paris, 1900, p. 98.

*Pelmatochromis taniatus* (non Bouleng. 1901), Bouleng. Ann. Mus. Congo, Zool. ii. p. 53, pl. xvi. (1902).

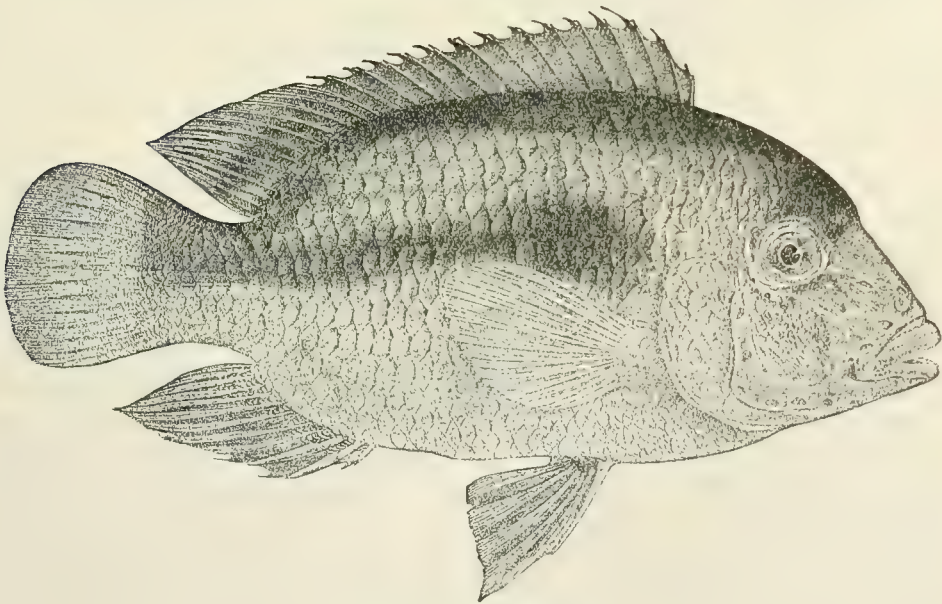
*Pelmatochromis polyodon*, Bouleng. Proc. Zool. Soc. 1902, i. p. 237.

*Pelmatochromis multidens*, Pelegr. Mém. Soc. Zool. France, xvi. 1904, p. 285.

*Paratilapia habereri*, Steind. Anz. Ak. Wien, 1912, p. 448, and Denkschr. Ak. Wien, lxxxix. 1913, p. 55, fig. 1, pl. ix. fig. 2.

Depth of body 2 to  $2\frac{1}{7}$  times in total length, length of head  $2\frac{3}{5}$  to  $2\frac{3}{4}$  times. Head  $1\frac{3}{4}$  to 2 times as long as broad; snout rounded, with

Fig. 277.

*Pelmatochromis multidens*.

Type of *P. polyodon* (A. M. C.).  $\frac{1}{2}$ .

straight, steep upper profile, as long as broad,  $1\frac{1}{5}$  (young) to 2 times as long as eye, which is  $3\frac{2}{3}$  to  $4\frac{3}{4}$  times in length of head; in the adult eye twice in interorbital width, and  $1\frac{1}{2}$  times in præorbital depth; mouth moderately large, extending to between nostril and eye; teeth



forming a broad band, in 7 or 8 series, outer rather large and numbering about 40 in upper jaw; 6 to 9 series of scales on the cheek, width of scaly part exceeding diameter of eye. Gill-rakers short, tubercular, 6 to 8 on lower part of anterior arch. Dorsal XIV 14; spines subequal from the third,  $\frac{1}{3}$  length of head; longest soft rays  $\frac{1}{2}$  length of head. Anal III 8-9; spines stronger than dorsals, third  $\frac{2}{5}$  length of head. Pectoral  $\frac{3}{4}$  length of head, not reaching origin of anal. Ventral reaching vent. Caudal rounded. Caudal peduncle deeper than long. Scales ctenoid, 29-30  $\frac{5}{13}$ ; lateral lines  $\frac{16-19}{12-14}$ . Brownish; a dark brown band between the eyes, another on each side of the body, from the head to the caudal peduncle, between the lateral lines; a roundish blackish spot on the lateral band above the pectoral fin; soft dorsal dark at the base.

Total length 260 millim.

Upper Congo.—Type in Paris Museum.

1. Type of *P. taniatus* Monsembe. Rev. J. H. Weeks (P.).  
= *polyodon*.

### 23. PELMATOCHROMIS ANGOLENSIS.

? *Hemichromis angolensis*, Steind. Mem. Ac. Lisb. (3) iii. pt. ii. 1865, no. 10; Bouleng. Proc. Zool. Soc. 1898, p. 136.

Depth of body  $2\frac{1}{2}$  times in total length, length of head  $2\frac{2}{3}$  to 3 times. Head 2 to  $2\frac{1}{4}$  times as long as broad; snout as long as broad, with slightly convex upper profile, as long as or a little longer than eye, which is  $3\frac{2}{3}$  to 4 times\* in length of head, equals interorbital width, and exceeds præorbital depth; mouth moderate, extending to below anterior border of eye; 2 series of teeth, outer rather large and bicuspid in the young, inner tricuspid in the young; 30 to 34 teeth in outer series of upper jaw; 6 or 7 series of scales on the cheek, width of scaly part equal to or exceeding diameter of eye. Gill-rakers very short, 8 to 10 on lower part of anterior arch. Dorsal XIV-XV 12-13; spines increasing in length to the last, which measures a little less than  $\frac{1}{2}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Anal III 9-10; third spine as long as or a little shorter than last dorsal. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not reaching vertical of origin of anal. Ventral reaching vent. Caudal rounded. Caudal peduncle as long as deep. Scales feebly denticulate, 33-34  $\frac{3\frac{1}{2}-4}{13}$ ; lateral lines  $\frac{20-22}{14-15}$ . Brown above,

\* 6 times in the larger specimen (200 millim.) described by Steindachner.

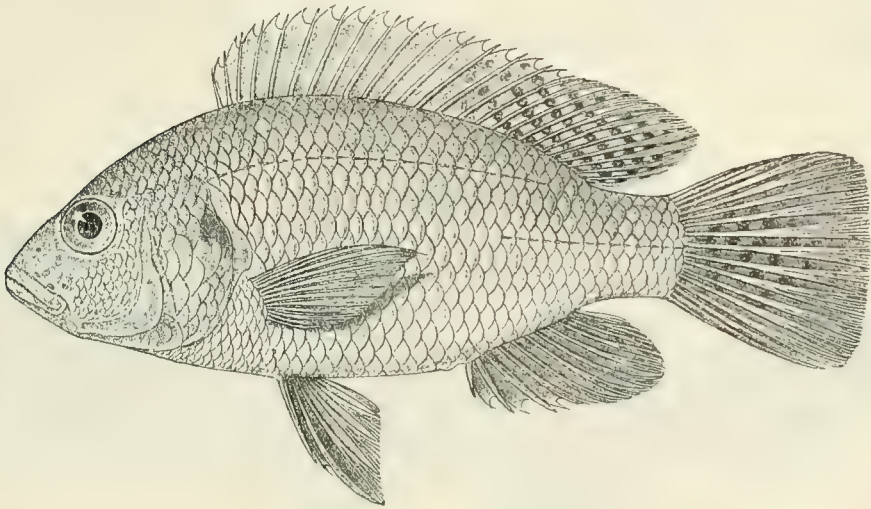
yellowish beneath; a dark opercular spot; dorsal and caudal with round dark spots, which may be replaced by rings.

Total length 110 millim.

Angola.—Type in Lisbon Museum.

1-2. Hgr. & yg.	Ponang Kuma, Mossamedes.	Dr. W. J. Ansorge (C.).
3. Skel.	"	"

Fig. 278.



*Pelmatochromis angolensis.*  
Ponang Kuma.

#### 24. PELMATOCHROMIS MULTIOCELLATUS.

Bouleng. Ann. & Mag. N. H. (8) xii. 1913, p. 484.

Depth of body equal to length of head, which is  $2\frac{4}{5}$  times in total length. Head  $2\frac{1}{4}$  times as long as broad; snout as long as broad, with slightly convex upper profile,  $1\frac{1}{3}$  times as long as eye, which is 4 times in length of head, equals interorbital width, and slightly exceeds præorbital depth; mouth rather large, extending to below anterior border of eye; 2 series of teeth, outer rather large, 50 in upper jaw; 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers very short, 9 on lower part of anterior arch. Dorsal XVI 10; spines increasing in length to the last, which measures  $\frac{2}{5}$  length of head; longest soft ray about  $\frac{2}{3}$  length of head. Anal III 9; third spine stronger but a little shorter than last dorsal. Pectoral  $\frac{2}{3}$  length of head, not reaching vertical of origin of anal. Ventral reaching vent.

Caudal rounded. Caudal peduncle a little longer than deep. Scales strongly denticulate,  $32 \frac{3\frac{1}{2}}{11}$ ; lateral lines  $\frac{21}{13}$ . Brown above, whitish beneath; a blackish opercular spot; a blackish bar below anterior third of eye; dorsal and caudal fins with very numerous small ocellar spots forming single series between the rays; anal fin with a few large ocelli.

Total length 120 millim.

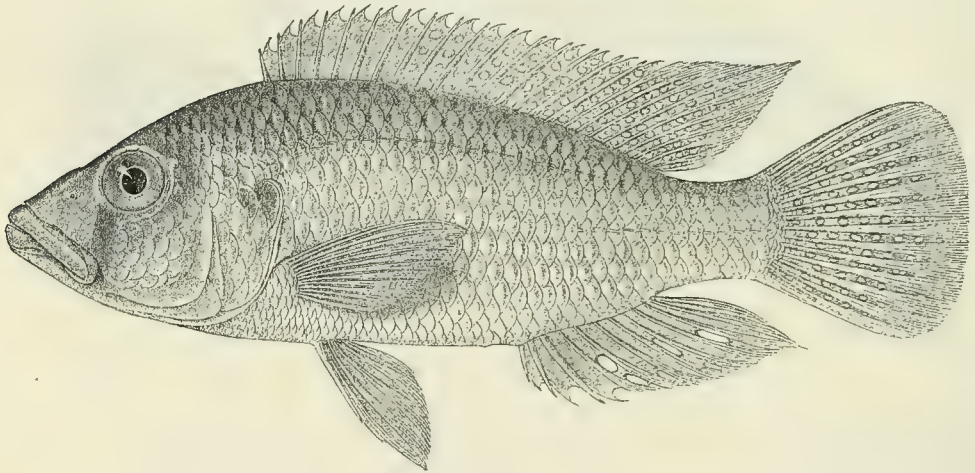
Angola (Luculla River).

1. Type.

Luculla R. at Luculla.

Dr. W. J. Ansorge (C.).

Fig. 279.



*Pelmatochromis multiocellatus.*

Type.

## 25. PELMATOCHROMIS DARLINGI.

Bouleng. Ann. & Mag. N. H. (8) vii. 1911, p. 377.

Depth of body equal to length of head,  $2\frac{4}{5}$  times in total length. Head  $2\frac{1}{3}$  times as long as broad; snout as long as broad, with slightly convex upper profile, a little longer than eye, which is  $3\frac{2}{3}$  times in length of head and slightly exceeds interorbital width or præorbital depth; mouth moderate, extending to below anterior border of eye; 3 series of teeth, outer rather large, 50 in upper jaw; 4 series of scales on the cheek, width of scaly part slightly less than diameter of eye. Gill-rakers very short, 9 on lower part of anterior arch. Dorsal XV 11; spines increasing in length to the last, which measures  $\frac{1}{2}$  length of head; longest soft ray  $\frac{2}{3}$  length of head. Anal III 8; third spine stronger but a little shorter than last dorsal. Pectoral a little shorter than head,



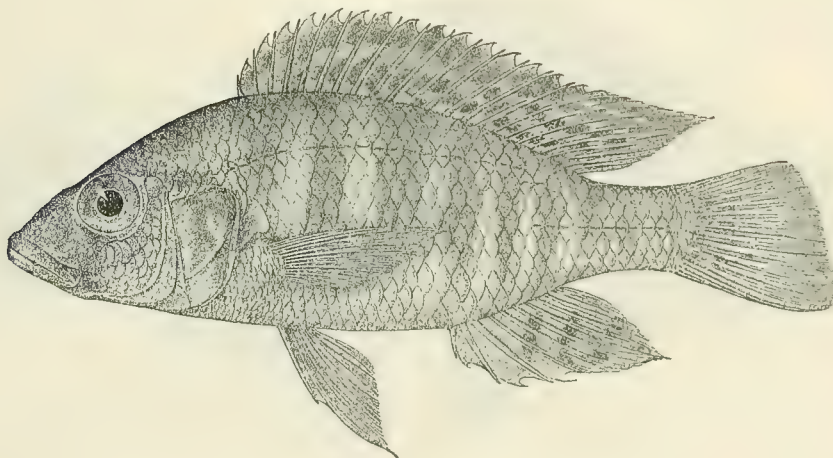
reaching vertical of origin of anal. Ventral extending a little beyond origin of anal. Caudal rounded (obliquely subtruncate). Caudal peduncle a little longer than deep. Scales feebly denticulate,  $32\frac{3\frac{1}{2}}{10}$ ; lateral lines  $\frac{22}{10}$ . Brownish above, whitish beneath, with seven very indistinct darker cross-bars; a dark bar below anterior third of eye; dorsal and anal fins with round brown spots.

Total length 110 millim.

Makabusi R., Zambesi System.

1. Type. Makabusi R., near Salisbury, J. ff. Darling, Esq. (P.).  
Mashonaland.

Fig. 280.



*Pelmatochromis darlingi*.

Type.

## 26. PELMATOCHROMIS RIPONIANUS.

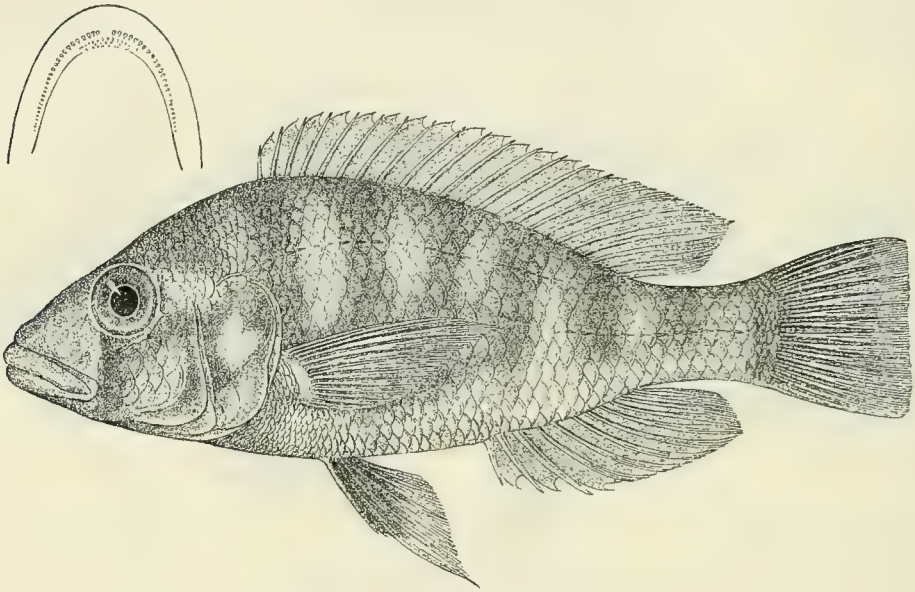
Bouleng. Ann. Mus. Genova, (3) v. 1911, p. 69, pl. ii. fig. 3.

Depth of body  $2\frac{1}{2}$  to 3 times in total length, length of head  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times. Head twice or a little over twice as long as broad; snout rounded, as long as broad, with feebly convex upper profile,  $1\frac{1}{4}$  to  $1\frac{2}{3}$  times as long as eye, which is  $3\frac{3}{4}$  to  $4\frac{2}{3}$  times in length of head, 1 to  $1\frac{1}{3}$  times in interorbital width, and exceeds least depth of præ-orbital; maxillary extending to below anterior border of eye or not quite so far; teeth conical, in 3 or 4 series, outer rather small, 50 to 60 in upper jaw, inner minute; 3 or 4 series of scales on the cheek, width of scaly part equal to diameter of eye. Gill-rakers rather short, 7 to 9 on lower part of anterior arch, the longest bifid. Dorsal



XV–XVI 8–10; spines increasing in length to the last, which measures  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Anal III 8–10; third spine longest, as long as and stronger than longest dorsal. Pectoral pointed,  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head, reaching vertical of origin of anal, or a little beyond. Ventral reaching origin of anal or a little beyond. Caudal truncate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. Scales feebly denticulate, 30–33  $\frac{5}{11-13}$ ; lateral lines  $\frac{19-22}{7-13}$ .

Fig. 281.

*Pelmatochromis riponianus*.

Type (Ann. Mus. Genova, 1911).

Brownish, uniform or with 6 or 7 rather indistinct darker cross-bands; a dark vertical bar may be present below the eye; ventrals blackish in the male, at least at the base, yellowish in the female.

Total length 140 millim.

Ripon Falls, Victoria Nile.—Types in Genoa Museum.

1–3. Types.

Jinja.

Dr. E. Bayon (C.);  
Genoa Museum (P.).

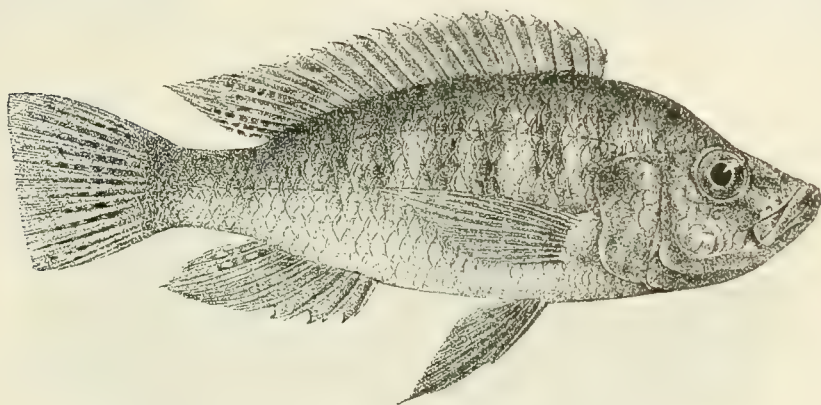
## 27. PELMATOCHROMIS MICRODON.

Bouleng. Ann. & Mag. N. H. (7) xvii. 1906, p. 441, and Fish. Nile, p. 490, pl. lxxxix. fig. 4 (1907).

Depth of body equal to length of head, 3 times in total length. Head

large, a little over twice as long as broad, with slightly concave upper profile; snout as long as broad,  $1\frac{1}{2}$  diameters of eye, which is 4 times in length of head,  $1\frac{1}{4}$  times in interorbital width, and a little more than depth of præorbital; mouth oblique, extending to below anterior border of eye; teeth very small and few, in 3 series; 3 series of scales on the cheek, the width of the scaly part equal to diameter of eye. Gill-rakers very short, posterior much expanded, much broader than long, 9 on lower part of anterior arch. Dorsal XV 9; spines increasing in length to the last, which measures  $\frac{2}{5}$  length of head; longest soft rays  $\frac{2}{5}$  length

Fig. 282.

*Pelmatochromis microdon.*Type (F. N.).  $\frac{2}{3}$ .

of head. Anal III 8; third spine as long as and stouter than last dorsal. Pectoral as long as head, extending to above base of third anal spine. Ventral reaching origin of anal. Caudal obliquely truncate, upper rays longest. Caudal peduncle  $1\frac{1}{3}$  times as long as deep. Scales denticulate,  $32\frac{4-5}{11}$ ; lateral lines  $\frac{21}{11}$ . Olive above, grey beneath, with six ill-defined darker vertical bars on the side; a blackish opercular spot; fins grey, posterior part of dorsal and caudal with small round darker spots forming regular series between the rays; posterior part of anal fin with a few small orange ocellar spots.

Total length 175 millim.

Lake Victoria.

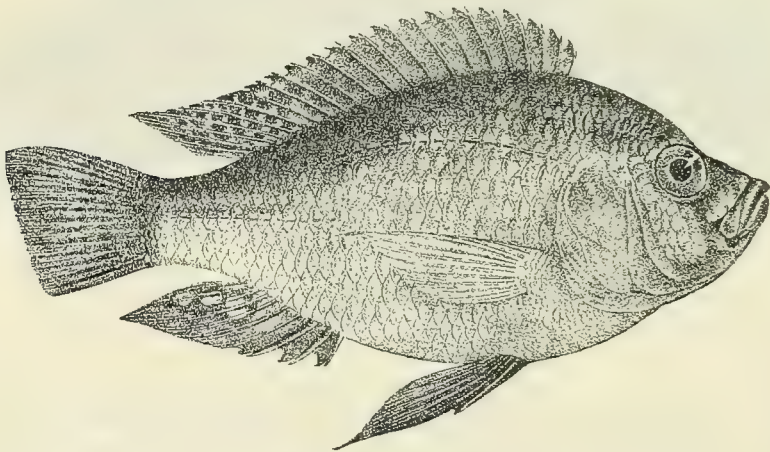
1. Type.	Bunjako.	Mr. E. Degen (C.).
2(?). Yg.	Entebbe.	„

## 28. PELMATOCHROMIS OBESUS.

Bouleng. Ann. & Mag. N. H. (7) xvii. 1906, p. 442, and Fish. Nile, p. 491, pl. lxxxix. fig. 5 (1907).

Depth of body 2 to  $2\frac{1}{2}$  times in total length, length of head 3 times. Head not twice as long as broad, with slightly concave upper profile; snout twice as broad as long in the adult, as long as eye, which is  $3\frac{1}{2}$  times in length of head,  $1\frac{1}{4}$  to  $1\frac{1}{2}$  times in interorbital width and much exceeds præorbital depth; mouth oblique, extending to below anterior border of eye; teeth small, in 2 or 3 series, 50 to 60 in outer series of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part exceeding a little diameter of eye. Gill-rakers short, some T-shaped, 8 to 10 on lower part of anterior arch. Dorsal XV 9; spines

Fig. 283.

*Pelmatochromis obesus.*

Type (F. N.).  $\frac{8}{9}$ .

increasing in length to the last, which measures  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{3}{5}$  length of head. Anal III 8-9; third spine stronger but a little shorter than last dorsal. Pectoral as long as head, extending to above base of third anal spine. Ventral extending to soft anal rays. Caudal obliquely truncate, upper rays longest. Caudal peduncle  $1\frac{1}{4}$  times as long as deep. Scales denticulate,  $32\frac{4-5}{13}$ ; lateral lines  $\frac{20-21}{11-13}$ . Olive above, with very indistinct dark cross-bands, yellowish white beneath; a rather indistinct dark vertical bar below the eye; a dark opercular spot; dorsal fin greyish, blackish towards the border, the soft portion with round dark spots; anal fin yellow, with two or three large



round orange spots on its posterior half; inner rays of ventral fin yellow, outer blackish; caudal fin greyish.

Total length 155 millim.

Lake Victoria.

1. Type.	Bunjako.	Mr. E. Degen (C.).
2. Type.	Entebbe.	"

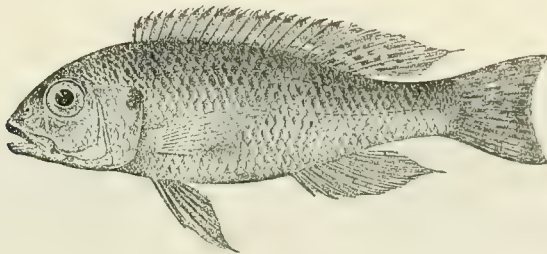
## 29. PELMATOCHROMIS AURITUS.

*Paratilapia aurita*, Bouleng. Ann. & Mag. N. H. (7) vii. 1901, p. 2, Poiss. Bass. Congo, p. 417 (1901), and Tr. Zool. Soc. xvi. 1901, p. 150, pl. xix. fig. 2.

*Pelmatochromis auritus*, Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 284; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 568, pl. xxxix. fig. 4.

Depth of body nearly equal to length of head, 3 to  $3\frac{1}{2}$  times in total length. Head 2 to  $2\frac{1}{4}$  times as long as broad; snout rounded, with convex upper profile, as long as broad and as long as eye in the adult,

Fig. 284.



*Pelmatochromis auritus*.  
Type (Tr. Z. S. 1901).  $\frac{3}{4}$ .

shorter in the young; eye  $2\frac{2}{3}$  (young) to  $3\frac{1}{2}$  times in length of head, equal to or greater than interocular width; mouth moderate, extending to below anterior fourth or third of eye; teeth small, in 2 or 3 series, 60 to 80 in outer series of upper jaw; 4 or 5 series of scales on the cheek, width of scaly part equal to or a little less than diameter of eye. Gill-rakers moderate, 10 to 12 on lower part of anterior arch. Dorsal XV–XVII 9–10; spines increasing in length to the last, which is  $\frac{1}{2}$  or a little less than  $\frac{1}{2}$  length of head; longest soft rays produced into filaments, as long as or a little shorter than head. Anal III 8; third spine stronger and shorter than last dorsal. Pectoral as long as or a little longer than head, reaching origin of anal or a little beyond.



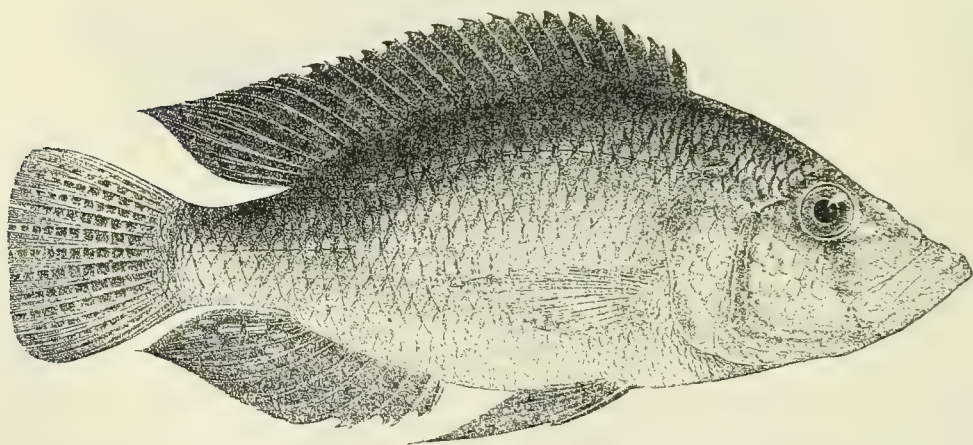
Ventral produced into a filament, extending to vent or beyond. Caudal feebly emarginate in the adult, truncate in the young. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as broad. Scales finely ctenoid, 33-37  $\frac{3-4}{9-10}$ ; lateral lines  $\frac{20-25}{13-18}$ . Olive-brown, with or without oblique cross-bars of mother-of-pearl or silvery white, sometimes with ill-defined dark bars across the the back; a very distinct, blue-black opercular spot; dorsal and anal grey or blackish, often striated or spotted with white, the former edged with yellow and black; pectorals yellowish, ventrals white; caudal with white spots and yellow bars, and edged with black or blackish.

Total length 130 millim.

Lake Tanganyika.

1-8. Types.	Msambu.	Prof. J. E. S. Moore (C.).
9. Skel.	"	"
10. Type.	N. end of L. Tanganyika.	"
11-12. Ad.	Kazzaga Market.	Dr. W. A. Cunningham (C.).
13-15. Yg.	Mshale.	"

Fig. 285.



*Pelmatochromis spekkii*.

Type (F. N.).  $\frac{1}{2}$ .

### 30. PELMATOCHROMIS SPEKKII.

Bouleng. Ann. & Mag. N. H. (7) xvii. 1906, p. 440, Fish. Nile, p. 486, pl. lxxxviii. fig. 2 (1907), and Ann. Mus. Genova, (3) v. 1911, p. 69.

Depth of body  $2\frac{2}{3}$  to  $3\frac{1}{4}$  times in total length, length of head  $2\frac{2}{3}$  to  $2\frac{4}{5}$  times. Head large,  $2\frac{1}{5}$  to  $2\frac{1}{2}$  times as long as broad, with straight or slightly concave upper profile; snout a little longer than broad, 1 (young)

to  $2\frac{1}{2}$  times as long as eye, which is  $3\frac{1}{3}$  (young) to 6 times in length of head,  $\frac{4}{5}$  to  $1\frac{1}{2}$  times in interorbital width and equals or exceeds præorbital depth; mouth large, oblique, extending to below anterior border of eye, or not quite so far; lower jaw more or less projecting in the adult; teeth in 3 to 6 series, all conical or a few of the inner tricuspid in the adult, outer more or less distinctly bicuspid and inner tricuspid in the young; outer teeth rather large and curved, 50 to 76 in upper jaw; 3 to 5 series of scales on the cheek, width of scaly part much greater than diameter of eye in the adult. Gill-rakers short, 8 to 10 on lower part of anterior arch. Dorsal XV–XVI 8–10; spines increasing in length to the last, which measures  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{2}{5}$  length of head. Anal III 8–10; third spine stronger than dorsals,  $\frac{1}{4}$  to  $\frac{1}{3}$  length of head. Pectoral  $\frac{2}{3}$  to  $\frac{5}{6}$  length of head, reaching origin of anal or a little beyond. Ventral reaching origin of anal or beyond. Caudal rounded. Caudal peduncle 1 to  $1\frac{1}{2}$  times as long as deep. Scales denticulate, 30–34  $\frac{4-6}{12-14}$ ; lateral lines  $\frac{19-23}{11-17}$ . Olive-brown to emerald-green above, silvery below; sometimes one or two more or less distinct dark lateral stripes, dark cross-bars on the back, and a vertical blackish bar below the eye; a dark opercular spot; dorsal and caudal fins greyish or bluish purple, the latter and the soft part of the dorsal with small round dark spots; anal yellow or greyish, sometimes bordered with red, often with a few large, orange, red-edged ocellar spots; ventrals yellow (females) or black (males). Young often uniform brownish above and white beneath.

Total length 235 millim.

Lake Victoria and Victoria Nile; Lake Albert Edward.

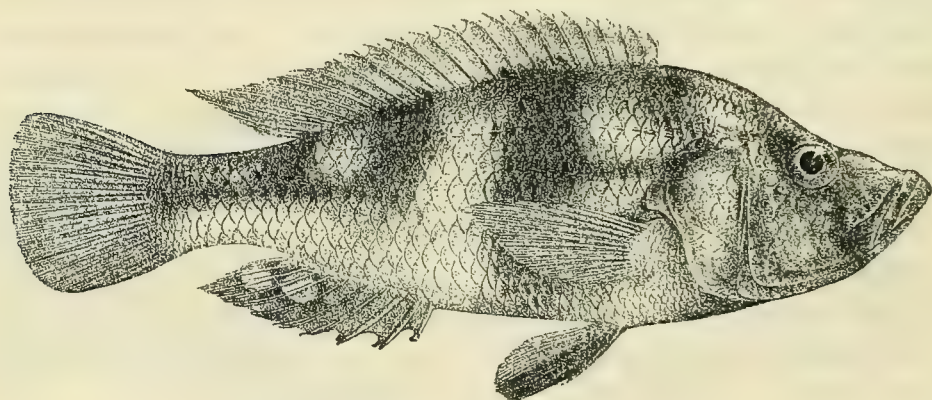
1–8. Types.	Entebbe.	Mr. E. Degen (C.).
9–10. Types.	Munyonya.	„
11–14. Types.	Bunjako.	„
15. Types.	Buganga.	„
16–17. Ad. & hgr.	Sesse Ids.	Dr. E. Bayon (C.); Genoa Museum (P.).
18. Skel.	„	„ „
19. Hgr.	Jinja, Ripon Falls.	„ „
20. Ad.	Victoria Nile between L. Kioga and Murchison Falls.	F. H. Melland, Esq. (P.).
21. Hgr.	L. Salisbury.	F. J. Jackson, Esq. (P.).
22–24. Ad. & yg.	L. Albert Edward.	Dr. H. Schubotz (C.); German C. African Expedition.

## 31. PELMATOCHROMIS FLAVIPINNIS.

Bouleng. Ann. & Mag. N. H. (7) xvii. 1906, p. 441, and Fish. Nile, p. 448, pl. lxxxix. fig. 3 (1907).

Depth of body equal to length of head, 3 times in total length. Head large, slightly more than twice as long as broad, with concave upper profile; snout as long as broad,  $1\frac{2}{3}$  times as long as eye, which is 5 times in length of head,  $1\frac{1}{4}$  times in interorbital width, and equals præorbital depth; mouth oblique, not extending quite to below anterior border of eye; lower jaw projecting; teeth in 3 or 4 series, outer largest and curved, 58 in upper jaw; 6 series of scales on the cheek, width of scaly part much greater than diameter of eye. Gill-rakers short, 9 on lower part of anterior arch. Dorsal XV 9; spines increasing in length to the last, which measures  $\frac{1}{3}$  length of head; longest soft rays a little more than  $\frac{1}{2}$  length of head. Anal III 8; third spine a little shorter than last dorsal. Pectoral  $\frac{3}{4}$  length of head, not reaching origin of anal. Ventral reaching vent. Caudal rounded. Caudal peduncle  $1\frac{1}{2}$  times as long as deep.

Fig. 286.

*Pelmatochromis flavipinnis.*Type (F. N.).  $\frac{8}{9}$ .

Scales denticulate,  $31\frac{7}{12}$ ; lateral lines  $\frac{22}{13}$ . Yellowish, tinged with orange on the sides, with four broad olive-brown cross-bands on the upper half of the body; an interrupted dark streak on each side from above the gill-cover to the base of the tail; head speckled with brown; an angular olive-brown band, pointing backwards, from eye to eye on the occiput; a broad blackish band from below the anterior half of the eye to the mouth; a blackish vertical bar on the præoperculum; an oblique blackish bar, involving the opercular spot, behind the gill-cover; fins



bright yellow, the ventral black on the outer side; two large round orange spots, encircled with red, on the posterior part of the anal fin.

Total length 145 millim.

Lake Victoria.

1. Type.

Buganga.

Mr. E. Degen (C.).

### 32. PELMATOCHROMIS CAVIFRONS.

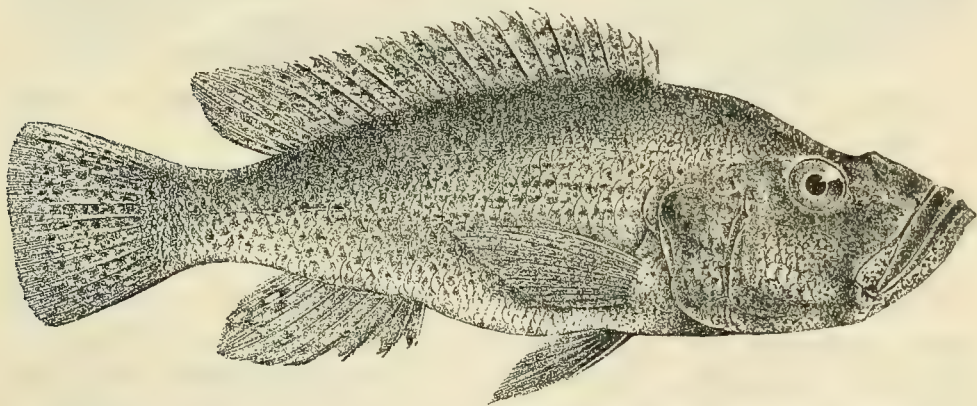
*Paratilapia? cavifrons*, Hilgend. Sitzb. Ges. nat. Fr. Berl. 1888, p. 77; Bouleng. Proc. Zool. Soc. 1898, p. 141.

*Hemichromis cavifrons*, Pfeff. Thierw. O.-Afr., Fische, p. 21 (1896).

*Pelmatochromis cavifrons*, Bouleng. Fish. Nile, p. 485, pl. lxxxviii. fig. 1 (1907), and Ann. Mus. Genova, (3) v. 1911, p. 68.

Depth of body  $2\frac{3}{4}$  to  $3\frac{1}{3}$  times in total length, length of head  $2\frac{1}{2}$  to  $2\frac{3}{4}$  times. Head large, 2 to  $2\frac{2}{5}$  times as long as broad; snout with slightly convex upper profile, as long as broad or a little broader than long, about twice as long as eye, which is  $\bar{5}$  to  $\bar{5}\frac{1}{2}$  times in length of

Fig. 287.



*Pelmatochromis cavifrons*.

Buganga (F. N.).  $\frac{2}{3}$ .

head,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times in interorbital width and equals præorbital depth; mouth large, very oblique, not extending quite to below anterior border of eye; lower jaw strongly projecting; teeth in 4 or 5 series, a few of the inner sometimes tricuspid, outer large and strongly curved, 60 to 70 in outer series of upper jaw; 5 or 6 series of scales on the cheek, width of scaly part greater than diameter of eye. Gill-rakers moderately long and stout, 7 to 9 on lower part of anterior arch. Dorsal XV-XVI 8-10; spines increasing in length to the last, which measures



about  $\frac{1}{3}$  length of head; longest soft rays about  $\frac{1}{2}$  length of head. Anal III 8-9; third spine as long as or a little shorter than last dorsal. Pectoral  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head, not reaching origin of anal. Ventral reaching vent. Caudal rounded. Caudal peduncle  $1\frac{1}{4}$  to  $1\frac{1}{2}$  times as long as deep. Scales denticulate, 37-45  $\frac{6-8}{15-16}$ ; lateral lines  $\frac{20-27}{10-13}$ . Yellowish olive above, more or less profusely spotted or speckled with black, silvery white beneath; a small black opercular spot; dorsal fin grey, with round whitish spots; caudal with round dark grey spots with whitish interspaces; pectoral greyish; ventral and anal yellow, the latter sometimes with two or three large orange ocellar spots edged with red.

Total length 200 millim.

Lake Victoria and Victoria Nile.—Type in Berlin Museum.

1-5. Ad.	Bunjako.	Mr. E. Degen (C.).
6. Skel.	"	"
7. Ad.	Buganga.	"
8. Ad.	Jinja, Ripon Falls.	Dr. E. Bayon (C.); Genoa Museum (P.).

### 33. PELMATOCHROMIS FRONTOSUS.

*Paratilapia frontosa*, Bouleng. Tr. Zool. Soc. xvii. 1906, p. 561, pl. xxxvii. fig. 1.

Depth of body  $2\frac{1}{3}$  to  $2\frac{2}{3}$  times in total length, length of head  $2\frac{2}{5}$  to nearly 3 times. Head twice as long as broad; forehead gibbose (probably in adult males only), the head at the interorbital region as deep as the body; snout a little longer than broad, a little longer than postocular part of head,  $2\frac{1}{3}$  times as long as eye, which is 5 to  $5\frac{1}{3}$  times in length of head and nearly twice in interorbital region; præorbital depth much greater than diameter of eye; mouth not extending to below anterior border of eye; teeth in 3 to 5 series, outer large, especially in front, 40 to 50 in upper jaw; 5 series of scales on the cheek, width of scaly part  $1\frac{1}{2}$  diameters of eye. Gill-rakers rather long, 10 to 13 on lower part of anterior arch. Dorsal XVIII-XIX 8-9; spines increasing in length to the last, which measures about  $\frac{1}{3}$  length of head; soft dorsal much produced, longest ray nearly as long as head. Anal III 7-8; third spine as long as, and stronger than, last dorsal. Pectoral as long as or longer than head, reaching vertical of origin of anal or beyond. Ventral produced into a long filament, extending beyond origin of anal. Caudal rounded.

Caudal peduncle as long as deep. Scales feebly denticulate, 34-36  $\frac{4\frac{1}{2}-5}{20-23}$ ; lateral lines  $\frac{23-25}{15-16}$ . Brownish above, whitish beneath, with five or six broad dark cross-bands, the last two on the caudal peduncle; a dark brown opercular spot and a large dark brown spot at the base of the pectoral fin; fins without markings.

Total length 255 millim.

Lake Tanganyika.

1. Type.

Kigoma.

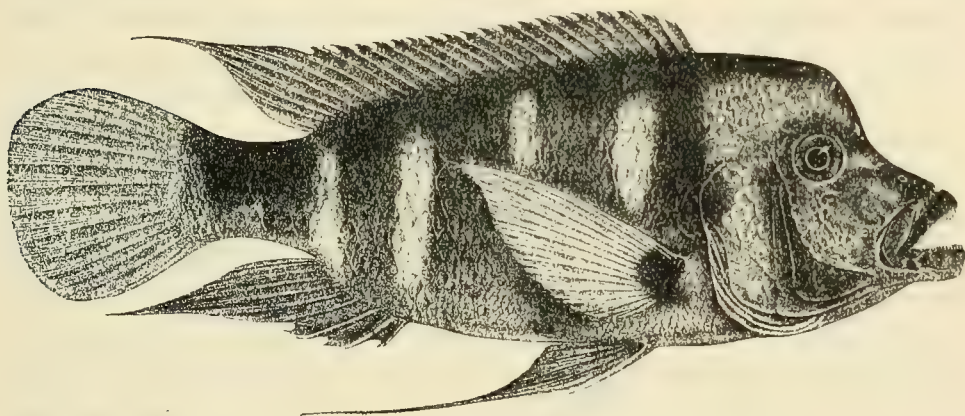
Dr. W. A. Cunningham (C.).

2. Ad.

Moliro.

Dr. L. Stappers (C.).

Fig. 288.



*Pelmatochromis frontosus*.

Type (Tr. Z. S. 1906).  $\frac{1}{2}$ .

### 34. PELMATOCHROMIS MACROPS.

*Paratilapia macrops*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 13, pl. iii. fig. 2, and Poiss. Bass. Congo, p. 423 (1901).

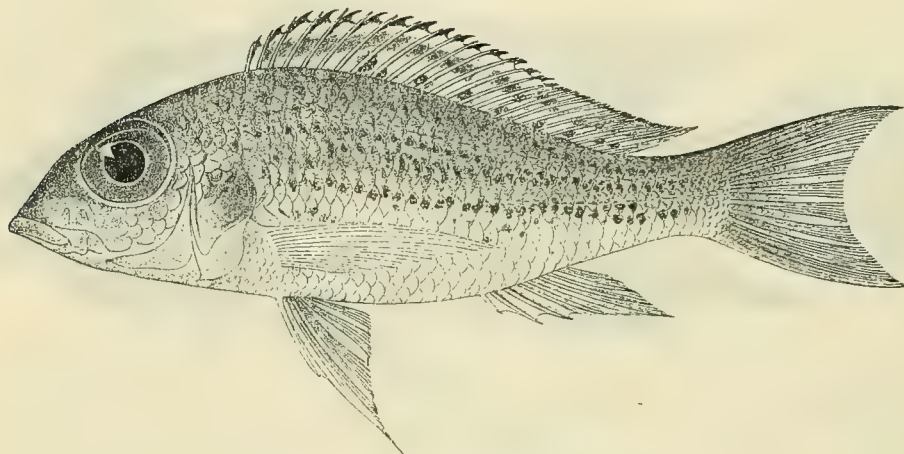
*Pelmatochromis macrops*, Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 284.

*Pelmatochromis melanostigma*, Bouleng. Tr. Zool. Soc. xvii. 1906, p. 567, pl. xxxix. fig. 1.

Depth of body  $2\frac{3}{4}$  to  $3\frac{1}{4}$  times in total length, length of head  $2\frac{2}{3}$  to 3 times. Head 2 to  $2\frac{1}{4}$  times as long as broad; snout a little broader than long, with straight or convex upper profile, as long as or a little shorter than eye, which is  $2\frac{3}{4}$  to 3 times in length of head, nearly twice interorbital width or least depth of præorbital; mouth moderate, extending to below anterior border of eye; teeth small, in 3 to 5 series, forming a narrow band, sometimes a few on the sides of the lower jaw strongly enlarged; 60 to 70 teeth in outer row of upper jaw; 2 or

3 series of scales on the cheek, width of scaly part about  $\frac{1}{2}$  diameter of eye. Gill-rakers short, 10 to 12 on lower part of anterior arch. Dorsal XV-XVI 10-13; spines equal in length from the sixth or seventh,  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; longest soft rays  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 6-7; third spine a little shorter than longest dorsal. Pectoral as long as or slightly shorter than head, reaching origin of anal. Ventral reaching origin of anal or beyond. Caudal with deep crescentic notch. Caudal peduncle as long as deep or a little longer than deep. Scales very finely denticulate, 33-38  $\frac{3\frac{1}{2}-4\frac{1}{2}}{10-11}$ ; lateral lines  $\frac{30-35}{15-23}$ , upper extending to the caudal or nearly so far. Olive or brown above, yellow on the

Fig. 289.

*Pelmatochromis macrops.*Type of *P. melanostigma* (Tr. Z. S. 1906).

sides, silvery below, with black dots or a series of five rather indistinct dark blotches on the side of the body; dorsal edged with black above, with or without black spots.

Total length 125 millim.

Lake Tanganyika.

1-2. Types.	Kinyamkolo.	Prof. J. E. S. Moore (C.).
3. Type.	Mbity Rocks.	"
4-5. Types of <i>P. melanostigma</i> .	Uvira.	Dr. W. A. Cunningham (C.).
6. Type of <i>P. melanostigma</i> .	Kaboge.	"
7-10. Types of <i>P. melanostigma</i> .	Niamkolo.	"
11. Skel.	"	"



12. Type of <i>P. melanostigma</i> .	Lofu.	Dr. W. A. Cunningham (C.).
13. Type of <i>P. melanostigma</i> .	Kituta.	"
14. Ad.	Moliro.	Dr. L. Stappers (C.).
15. Ad.	Albertville.	Capt. Hecq (C.).
16. Ad.	Vua.	Dr. L. Stappers (C.).

## 35. PELMATOCHROMIS STAPPERSII.

Bouleng. Rev. Zool. Afr. iii. 1914, p. 444.

Depth of body  $3\frac{1}{2}$  to  $4\frac{1}{4}$  times in total length, length of head  $2\frac{2}{3}$  to 3 times. Head 2 to  $2\frac{1}{4}$  times as long as broad; snout as long as broad, with convex upper profile, as long as or a little longer than eye, which is  $2\frac{3}{4}$  to 3 times in length of head, nearly  $1\frac{1}{2}$  times interorbital width, and nearly twice least depth of præorbital; mouth rather small, not reaching vertical of anterior border of eye; teeth very minute, in 4 or 5 series, forming a narrow band, 64 to 80 in outer row of upper jaw; 2 series of scales on the cheek, width of scaly part not quite  $\frac{1}{2}$  diameter of eye. Gill-rakers short, 13 to 16 on lower part of anterior arch. Dorsal XII–XIV 12–13; spines slender, equal in length from the fifth or sixth, about  $\frac{2}{5}$  length of head, soft rays not or but slightly longer. Anal III 8–9; third spine about  $\frac{1}{3}$  length of head. Pectoral as long as or a little shorter than head, reaching or nearly reaching origin of anal. Ventral reaching vent or a little beyond. Caudal with deep crescentic notch. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times as long as deep. Scales finely denticulate, 34–38  $\frac{2\frac{1}{2}-3}{11-12}$ ; lateral lines  $\frac{24-38}{10-15}$ . Brownish, with a lateral series of dark spots, which may be confluent into a band, and a dorsal series of similar spots; male with a large black opercular spot and a series of brown spots along the dorsal, which is finely edged with black; female with a large blackish spot in the middle of the spinous dorsal.

Total length 95 millim.

Lake Tanganyika.—Types in Congo Museum, Tervueren.

1–2. Types.	Tulo.	Dr. L. Stappers (C.).
3–5. Types.	Kilewa Bay.	"

## 36. PELMATOCHROMIS PLEUROSPILUS.

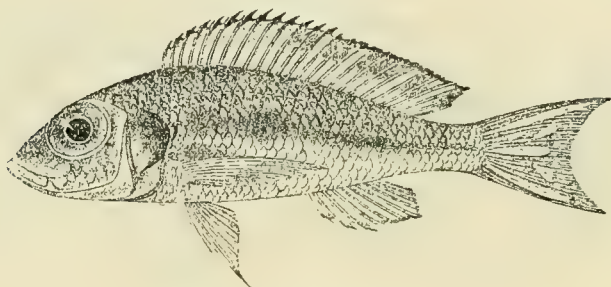
Bouleng. Tr. Zool. Soc. xvii. 1906, p. 567, pl. xxxix. fig. 2.

Depth of body  $3\frac{1}{2}$  times in total length, length of head  $2\frac{3}{4}$  to 3 times. Head twice as long as broad; snout as long as broad, with convex upper profile, as long as or a little shorter than eye, which is  $2\frac{3}{4}$  to 3 times in



length of head, nearly  $1\frac{1}{2}$  times interorbital width, and nearly twice least depth of præorbital; mouth moderate, not extending quite to below anterior border of eye; teeth small, in 3 or 4 series, forming a narrow band, 50 to 60 in outer row of upper jaw; 2 series of scales on the cheek, width of scaly part about  $\frac{1}{2}$  diameter of eye. Gill-rakers short, 11 or 12 on lower part of anterior arch. Dorsal XII-XIII 12-13; spines equal in length from the fifth,  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head, soft rays not or but slightly longer. Anal III 7-8; third spine as long as longest dorsal. Pectoral slightly shorter than head, reaching origin of anal. Ventral reaching origin of anal. Caudal with deep crescentic notch. Caudal peduncle  $1\frac{1}{2}$  times as long as deep. Scales finely denticulate,

Fig. 290.

*Pelmatochromis pleurospilus.*

Type (Tr. Z. S. 1906).

32-35  $\frac{2\frac{1}{2}}{10}$ ; lateral lines  $\frac{22-28}{8-14}$ . Olive above, silvery white beneath; a black opercular spot, followed by a series of two to six black spots along the side of the body; dorsal black-edged, with blackish or brownish spots; caudal with an orange band, with (males) or without (females) white and grey markings.

Total length 75 millim.

Lake Tanganyika.

1-3. Types.

Mpala.

Dr. W. A. Cunningham (C.).

4-6. Types.

Tembwi.

„

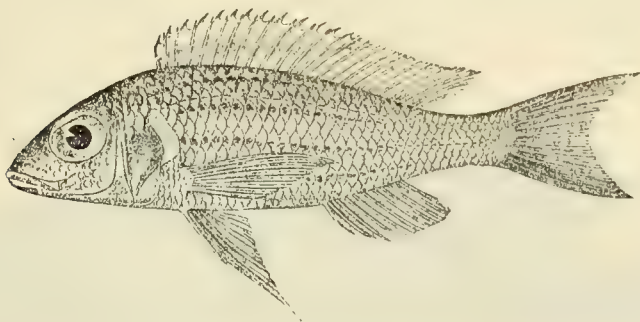
### 37. PELMATOCHROMIS RHODOSTIGMA.

Bouleng. Tr. Zool. Soc. xvii. 1906, p. 568, pl. xxxix. fig. 3.

Depth of body  $3\frac{2}{5}$  to  $3\frac{1}{2}$  times in total length, length of head  $2\frac{2}{3}$  to 3 times. Head  $2\frac{1}{4}$  to  $2\frac{1}{2}$  times as long as broad; snout as long as

broad, with more or less convex upper profile, as long as eye, which is 3 times in length of head, nearly  $1\frac{1}{2}$  times interorbital width, and  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times least depth of præorbital; mouth moderate, extending to below anterior border of eye; teeth in 3 series, forming a narrow band, a few on the sides of the lower jaw strongly enlarged; 40 to 50 teeth in outer row of upper jaw; 2 or 3 series of scales on the cheek, width of scaly part about  $\frac{1}{2}$  to  $\frac{2}{3}$  diameter of eye. Gill-rakers short, 10 to 13 on lower part of anterior arch. Dorsal XIII 12-14; spines equal from the fifth or sixth, about  $\frac{2}{5}$  length of head, soft rays not longer. Anal III 6-8; third spine as long as longest dorsal. Pectoral as long as head, reaching origin of anal. Ventral reaching origin of anal or not quite so far.

Fig. 291.

*Pelmatochromis rhodostigma.*

Type (Tr. Z. S. 1906).

Caudal with deep crescentic notch. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times as long as deep. Scales finely denticulate, 32-35  $\frac{3\frac{1}{2}}{10-11}$ ; lateral lines  $\frac{22-28}{8-14}$ . Olive above, silvery white below; longitudinal series of pink dots on the body or a lateral series of greyish spots; throat pink, a dark opercular spot sometimes present; dorsal streaked with pink, with a dark streak running along the middle; pectorals and ventrals pink; a pink band on each lobe of the caudal.

Total length 90 millim.

Lake Tanganyika.

1-2. Types.

Mshale.

Dr. W. A. Cunnington (C.).

3. Ad.

Uvira.

Dr. L. Stappers (C.).

4. Ad.

Mouth of Little Rusisi R.

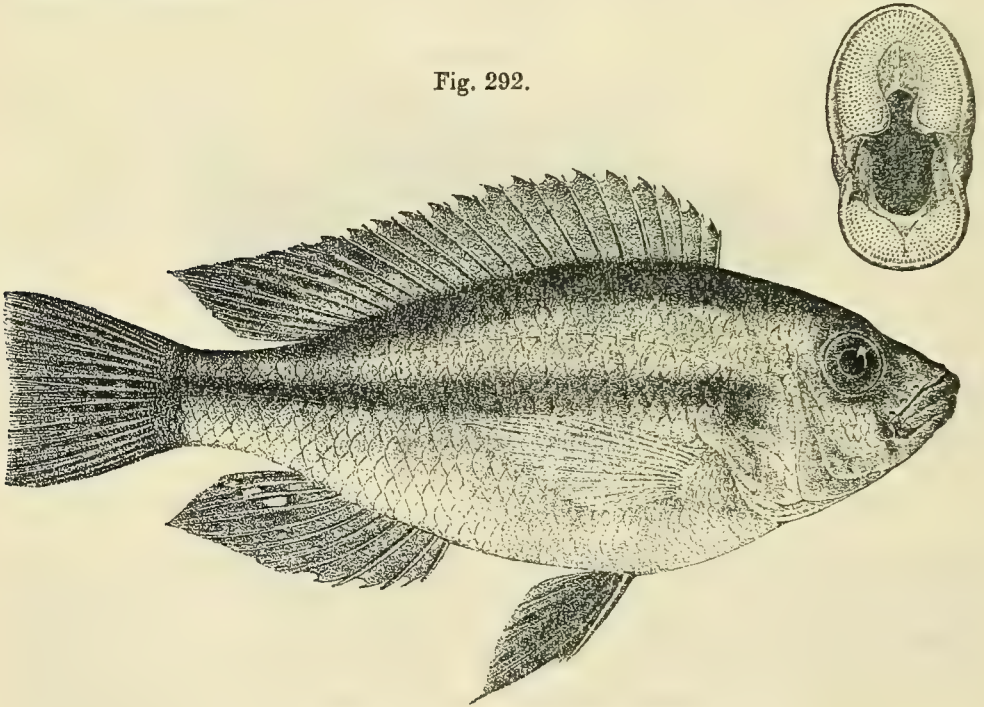
14. *PLATYTÆNIODUS*.

Bouleng. Ann. & Mag. N. H. (7) xvii. 1906, p. 451, and Fish. Nile, p. 493 (1907).

Body moderately elongate; scales ctenoid; two incomplete lateral lines. Jaws with very broad bands of small conical teeth, the alveolar surface of the præmaxillaries widening towards the pharynx, the band of teeth in the upper jaw horseshoe-shaped, that in each ramus of the lower jaw not much longer than broad. A very small part of the maxillary exposed when the mouth is closed. Dorsal fin with 15 or 16 spines, anal with 3.

Lake Victoria.

Fig. 292.



*Platytaeniodus degeni*.

Type (F. N.).

1. *PLATYTÆNIODUS DEGENI*.

Bouleng. ll. cc. pl. xci. fig. 1, and Ann. Mus. Genova, (3) iv. 1909, p. 306.

Depth of body  $2\frac{2}{3}$  to 3 times in total length, length of head 3 times. Head twice or not quite twice as long as broad; snout with convex upper profile, its length equal to interorbital width and  $1\frac{1}{5}$  times diameter of eye, which is 4 times in length of head; mouth not extending quite



to below anterior border of eye, its width  $\frac{1}{2}$  that of head; lips thick; 4 series of scales on the cheek. Gill-rakers short, 9 on lower part of anterior arch. Dorsal XV–XVI 10; spines increasing in length to the last, which measures  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{4}$  length of head. Anal III 9–10; third spine  $\frac{2}{5}$  to not quite  $\frac{1}{2}$  length of head. Pectoral as long as head, extending to above origin of anal. Ventral reaching beyond origin of anal. Caudal truncate. Caudal peduncle  $1\frac{1}{2}$  times as long as deep. Scales feebly denticulate, 33–35  $\frac{5}{12-13}$ ; lateral lines  $\frac{22-23}{13-15}$ . Pale olive above, silvery white beneath, with or without six or seven ill-defined darker cross-bars; a blackish opercular spot; a dark grey or blackish band from this spot to the root of the caudal fin; a rather indistinct dark vertical bar below the eye; dorsal and caudal fins greyish; ventral fins yellow, or with the outer rays blackish; anal yellow, with or without three orange ocellar spots, encircled with red, on the posterior part.

Total length 140 millim.

Lake Victoria.

1. Type.	Bunjako.	Mr. E. Degen (C.).
2. Ad.	Sesse Is.	Dr. E. Bayon (C.); Genoa Museum (P.).

### 15. HEMICHROMIS.

Peters, Mon. Berl. Ac. 1857, p. 403; Günth. Cat. Fish. iv. p. 274, part. (1862); Bouleng. Proc. Zool. Soc. 1898, p. 134, and Poiss. Bass. Congo, p. 409 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 252; Bouleng. Fish. Nile, p. 461 (1907).

*Chromichthys*, Guichen. in A. Dum. Arch. Mus. x. 1859, p. 257.

Body short or moderately elongate; scales cycloid or very feebly denticulate; two incomplete lateral lines. Teeth conical, in one series, or with one, very rarely two, series of a few very small teeth behind the outer; the two median teeth of the outer series usually larger than the others. Maxillary bone narrow and curved behind, concealed when the mouth is closed. Dorsal with 13 to 15 spines, anal with 3. Occipital and parietal crests strong, extending to between the orbits; præmaxillary processes extending to between the orbits. Vertebrae 26–28\*.

Africa.

\* 15+13 in *H. fasciatus*, 14+12 in *H. bimaculatus*.



*Synopsis of the Species.*

Snout much longer than eye in adult ;

Sc. 29-32  $\frac{3-3\frac{1}{2}}{10-11}$  . . . . . 1. *H. fasciatus*, Peters, p. 423.

Snout not or but little longer than eye ;

Sc. 25-29  $\frac{2\frac{1}{2}-3}{9-11}$  . . . . . 2. *H. bimaculatus*, Günth., p. 430.

## 1. HEMICHROMIS FASCIATUS.

Peters, Mon. Berl. Ac. 1857, p. 403 ; Günth. Cat. Fish. iv. p. 274 (1862) ; Bleek. Nat. Verh. Vet. Haarlem, xviii. no 2, 1863, p. 38, pl. v. fig. 1 ; Steind. Sinzb. Ak. Wien, lx. i. 1870, p. 970 ; Sauv. N. Arch. Mus. (2) iii. 1880, p. 35 ; Steind. Notes Leyd. Mus. xvi. 1894, p. 47 ; Bouleng. Proc. Zool. Soc. 1898, p. 135, and Poiss. Bass. Congo, p. 409 (1901) ; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 253.

*Chromichthys elongatus*, Guichen. in A. Dum. Arch. Mus. x. 1859, p. 257, pl. xxii. fig. 3.

*Hemichromis auritus*, Gill, Proc. Ac. Philad. 1862, p. 135 ; Günth. t. c. p. 275.

*Hemichromis leiguardii*, Capello, Jorn. Sc. Lisb. iv. 1872, p. 85.

*Hemichromis desquezi*, Rochebr. Bull. Soc. Philom. (7) iv. 1880, p. 168, and Act. Soc. Linn. Bord. vi. 1882, p. 113, pl. v. fig. 6.

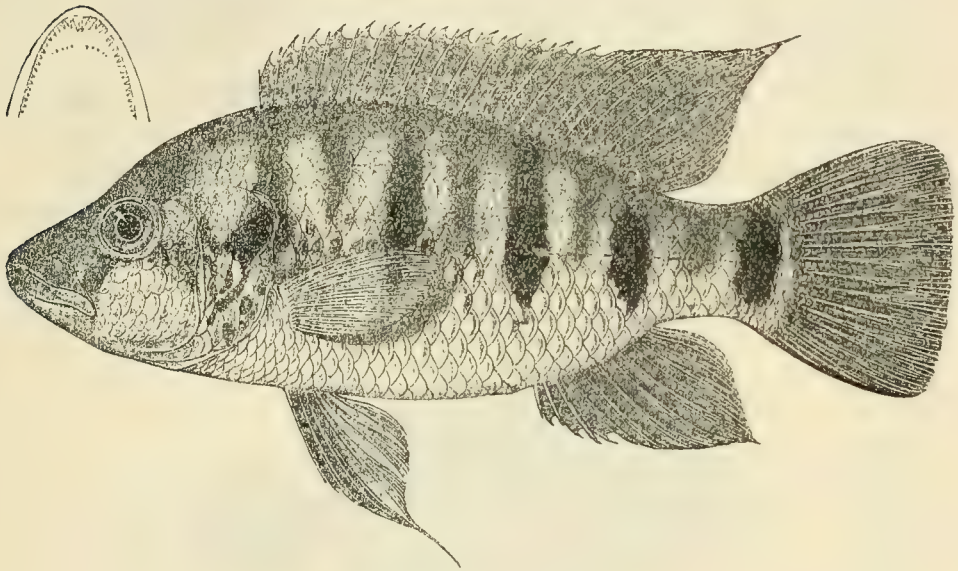
Depth of body  $2\frac{1}{4}$  to 3 times in total length, length of head  $2\frac{1}{2}$  to 3 times. Head  $1\frac{3}{4}$  to 2 times as long as broad ; snout with straight or concave upper profile, longer than the eye in the adult ; eye  $3\frac{1}{2}$  (young) to 6 times in length of head,  $1\frac{3}{4}$  to  $1\frac{3}{2}$  times in interorbital width ; mouth not extending to below anterior border of eye ; middle outer teeth large and canine-like in the adult ; an inner series of minute teeth in the upper jaw, widely separated from the outer ; 4 to 6 series of scales on the cheek, width of scaly part 1 (young) to  $2\frac{1}{4}$  diameters of eye in the adult. Gill-rakers short, the largest anvil-shaped, 6 to 10 on lower part of anterior arch. Dorsal XIII-XV 11-13 ; spines increasing in length to the last, which measures  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head and  $\frac{2}{5}$  to  $\frac{3}{5}$  longest soft rays. Anal III 8-10 ; third spine shorter than last dorsal. Pectoral  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head, not extending to vertical of origin of anal. Ventral usually more or less produced into a filament, reaching vent or origin of anal, rarely not to vent. Caudal rounded or subtruncate. Caudal peduncle as long as deep or a little deeper than long. Scales cycloid or very feebly denticulate, 29-32  $\frac{3-3\frac{1}{2}}{10-11}$  ; lateral lines  $\frac{15-19}{10-15}$ . Yellowish or olive brown above, tinged or not with red and green, white beneath ; five more or less distinct dark or black spots or bars on each side, between which narrower bars may be present ; a large

black or dark blue opercular spot; vertical fins greyish to blackish, soft dorsal and anal often with small dark and light spots; edge of soft dorsal and upper corner of caudal sometimes whitish.

Total length 265 millim.

Senegambia to Angola and Lake Ngami.—Types in Berlin Museum.

Fig. 293.



*Hemichromis fasciatus.*

Lagos.  $\frac{5}{8}$ .

1-3, 4-10. Ad.	St. Louis, Senegal.	M. P. Delhez (C.).
& yg.		
11-14. Ad. & hgr.	Gambia.	J. S. Budgett, Esq. (P.).
15. Hgr.	Bissau, Portug. Guinea.	Dr. W. J. Ansorge (C.).
16. Ad.	Corbal R. at Gam Besse, Portug. Guinea.	"
17-26. Ad. & hgr.	St. George's Water, Sierra Leone.	Sir H. H. Johnston (P.).
27. Skel.	" "	"
28-30. Ad.	Mountain streams, Freetown, Sierra Leone.	Dr. Hopkins (P.).
31-34. Ad. & hgr.	Nanna Kru, Liberia.	W. P. Lowe, Esq. (C.).
35-44. Ad. & yg.	Akropon, Gold Coast.	R. B. N. Walker, Esq. (C.); Dr. A. Günther (P.).
45-46. Hgr.	Tano R., "	Dr. H. G. F. Spurrell (P.).
47-48. Ad.	Sacred Lake, Bucumachi, nr. Kumasi R., Ashantee.	C. Beddington, Esq. (P.).

49-52. Ad.	Lagos.	H. T. Ussher, Esq. (C.).
53-62. Ad. & hgr.	Lagos Lagoon.	Major G. E. Bruce (P.).
63-68. Hgr. & yg.	Odo Omi, Omi R., Lagos.	"
69-76. Ad., hgr., & yg.	Sapelle, Lower Niger.	Dr. W. J. Ansorge (C.).
77-78. Ad.	Oguta, "	"
79. Ad.	Benue R., N. of Ibi.	H. L. Norton Traill, Esq. (C.).
80-81. Ad. & hgr.	Azuminié Creek, Old Calabar.	Miss Kingsley (P.).
82-84. Ad. & hgr.	Ja R., S. Cameroon.	G. L. Bates, Esq. (C.).
85-86. Ad.	Benito R., Spanish Guinea.	"
87-88. Ad.	Gaboon.	R. B. N. Walker, Esq. (P.).
89, 90-94. Ad., hgr., & yg.	"	"
95-96. Ad. & hgr.	Sette Cama, Gaboon.	"
97-103. Ad., hgr., & yg.	Ogowe.	Miss Kingsley (C.).
104-105. Ad.	Lebuzi R. at Kuka Muno, Chiloango.	Dr. W. J. Ansorge (C.).
106. Hgr.	Culufi R. above Bafata, Chiloango.	"
107-108. Ad. & hgr.	L. Chilungo, near Landana.	"
109. Ad.	Lower Congo.	M. F. Hens (C.).
110, 111-112. Ad. & yg.	Monsembe, Upper Congo.	Rev. J. H. Weeks (P.).
113. Ad.	Ibali, L. Leopold II.	M. P. Delhez (C.).
114. Ad.	Avakubi, Lindi R., Upper Congo.	Dr. C. Christy (C.).
115. Yg.	Lindi R., Upper Congo.	M. M. Storms (C.) ; Brussels Museum (E.).
116. Hgr.	Banzyville, Ubanghi.	Capt. Royaux (C.).
117-118. Ad.	Quanza R. at Cunga, Angola.	Dr. W. J. Ansorge (C.).
119-120. Ad.	W. Africa.	C. Schwanz, Esq. (P.).
121-123. Ad.	Okovango R., near L. Ngami.	R. B. Woosnam, Esq. (C.).

## 2. HEMICHROMIS BIMACULATUS.

Gill, Proc. Ac. Philad. 1862, p. 137; Günth. Cat. Fish. iv. p. 275 (1862); Steind. Sitzb. Ak. Wien, lx. i. 1870, p. 972, pl. i. fig. 5; Sauv. N. Arch. Mus. (2) iii. 1880, p. 35, pl. ii. fig. 1; Steind. Notes Leyd. Mus. xvi. 1894, p. 49; Günth. Ann. & Mag. N. H. (6) xvii. 1896, p. 272; Bouleng. Proc. Zool. Soc. 1898, p. 135, and Poiss. Bass. Congo, p. 411 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 255; Bouleng. Fish. Nile, p. 461, pl. lxxxvi. fig. 1 (1907).



*Hemichromis guttatus*, Günth. Cat. t. c. p. 275.

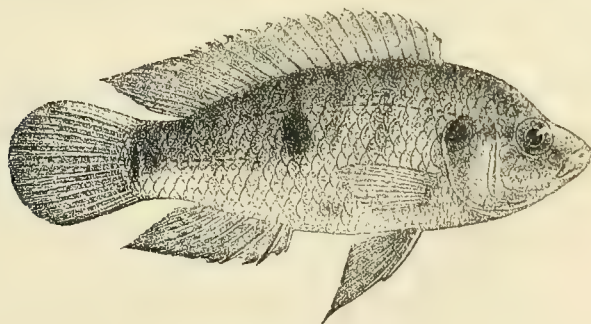
*Hemichromis letourneuxii*, Sauv. Bull. Soc. Philom. (7) iv. 1880, p. 212.

*Hemichromis saharæ*, Sauv. t. c. p. 226; Rolland, Rev. Scientif. (4) ii. 1904, p. 418, fig.

*Hemichromis rolandi*, Sauv. op. cit. v. 1881, p. 103; Rolland, l. c.

Depth of body  $2\frac{1}{4}$  to 3 times in total length, length of head  $2\frac{4}{5}$  to  $3\frac{1}{6}$  times. Head  $1\frac{1}{2}$  to 2 times as long as broad; snout with straight or convex upper profile, as long as or a little longer than eye, shorter in the very young; eye  $2\frac{1}{2}$  (young) to 4 times in length of head, 1 to  $1\frac{1}{3}$  times in interorbital width; mouth extending to below anterior border of eye, or not quite so far; middle outer teeth not or but feebly enlarged; usually one, very rarely two series of minute teeth, if any, behind the outer; 3 to 5 series of scales on the cheek, width of scaly part equal to or a little less than diameter of eye. Gill-rakers

Fig. 294.



*Hemichromis binaculatus*.

White Nile (F. N.).  $\frac{4}{5}$ .

short, 8 to 10 on lower part of anterior arch. Dorsal XIII-XV 9-13; spines increasing in length to the last, which measures  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head and  $\frac{3}{5}$  to  $\frac{3}{4}$  longest soft rays. Anal III 7-9; third spine as long as or shorter than last dorsal. Pectoral  $\frac{3}{5}$  to  $\frac{4}{5}$  length of head, not extending to vertical of origin of anal. Ventral produced into a filament, reaching vent or anal. Caudal rounded. Caudal peduncle a little deeper than long. Scales cycloid, 25-29  $\frac{2\frac{1}{2}-3}{9-11}$ ; lateral lines  $\frac{15-19}{7-11}$ . Yellowish brown or red, with or without blue dots; a large bluish-black spot on the gill-cover, another on the middle of the side of the body, and often a third at the base of the caudal fin, these spots sometimes surrounded by a pale circle; ill-defined dark cross-bars may be present on the body; small irregular dark spots sometimes present on the body;



vertical fins greyish white, edged with brown, with or without crimson and pale blue dots.

Total length 150 millim.

Nile and Sahara to Congo.—Types in U. S. National Museum.

1. One of the types of <i>H. le-tourneuxi</i> .	L. Marcotis.	M. Letourneux (C.) ; Paris Museum (E.).
2-21. Ad., hgr., & yg.	Kaka, White Nile.	L. Loat, Esq. (C.).
22-41. Ad., hgr., & yg.	Gharb-el-Aish, White Nile.	„
42-51. Ad., hgr., & yg.	Fashoda, White Nile.	„
52-55, 56. Hgr.	Mouth of L. No.	„
57-63. Hgr. & yg.	Gondokoro, Bahr-el-Gebel.	„
64-65. Types of <i>H. saharae</i> .	Wed Rir, Algerian Sahara.	M. G. Rolland (C.) ; Paris Museum (E.).
66-68. Types of <i>H. rolandi</i> .	Wed Rir.	„ „
69. Hgr.	„	Dr. C. Gaillard (P.).
70-71. Hgr.	Near Biskra.	W. J. Harding King, Esq. (P.).
72. Ad.	Gambia.	Capt. Vipan (P.).
73. Ad.	Corbal R. at Tchitote, Portug. Guinea.	Dr. W. J. Ansorge (C.).
74. Hgr.	Geba R. above Bafata, Portug. Guinea.	„
75-84. Ad. & hgr.	Freetown, Sierra Leone.	R. Dinzey, Esq. (P.).
85. Ad.	Mountain streams, Freetown, Sierra Leone.	Dr. Hopkins (P.).
86. Hgr.	Dunkwa R., Gold Coast.	R. B. N. Walker, Esq. (C.) ; Dr. A. Günther (P.).
87, 88. Ad.	Nigeria.	Capt. Vipan (P.).
89-90. Ad.	Niger.	Mr. J. T. Dalton (C.).
91-93. Ad. & hgr.	Sapelle, Lower Niger.	Dr. W. J. Ansorge (C.).
94-97. Ad. & hgr.	Abo, „	„
98. Ad.	Agberi, „	„
99. Yg.	Ossomari, „	„
100. Ad.	Kwala, Ethiop R.	Capt. R. D. Gard'ner (P.).
101. Hgr.	Tubusi Narob, French C. Africa.	P. A. Talbot, Esq. (P.).
102. Ad.	Old Calabar.	D. J. Rutherford, Esq. (C.).
103-104. Hgr.	„	Mr. J. Paul Arnold (P.).

105-106. Ad.	Efulen, S. Cameroon.	G. L. Bates, Esq. (C.).
107. Ad.	Gaboon.	
108-109. Ad. & hgr.	Ogowe.	Miss Kingsley (C.).
110-111. Hgr.	Ngomo, Ogowe.	Rev. E. Haug (C.); Paris Museum (E.).
112. Hgr.	Boma, Lower Congo.	M. P. Delhez (C.).
113-117, 118-121. Ad. & hgr.	Monsembe, Upper Congo.	Rev. J. H. Weeks (P.).
122-123. Ad. & hgr.	Banzville, Ubanghi.	Capt. Royaux (C.).
124-125. Types of <i>H. guttatus</i> .	— ?	
126. Skel.	W. Africa.	

## 16. CHAMPSOCHROMIS, g. n.

*Paratilapia*, part., Bouleng. Proc. Zool. Soc. 1898, p. 137; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 256.

Like *Paratilapia*, but præmaxillaries expanded at the symphysis, beak-like, occipital crest extending forward beyond the orbits, and teeth of outer row very large and widely spaced. Vertebræ 36-39\*.

Lake Nyassa.

*Synopsis of the Species.*

- D. XVI 13; depth of body 4 times in total length; 11 gill-rakers on lower part of anterior arch; caudal deeply emarginate. . . 1. *C. cæruleus*, Blgr., p. 433.  
 D. XVI-XVIII 11-12; depth of body 4 to  $4\frac{1}{2}$  times in total length; 15-17 gill-rakers . . . 2. *C. longiceps*, Gthr., p. 434.  
 D. XVIII-XX 12-13; depth of body  $4\frac{3}{4}$  to  $5\frac{1}{4}$  times in total length; 15-16 gill-rakers . . . 3. *C. esox*, Blgr., p. 435.

## 1. CHAMPSOCHROMIS CÆRULEUS.

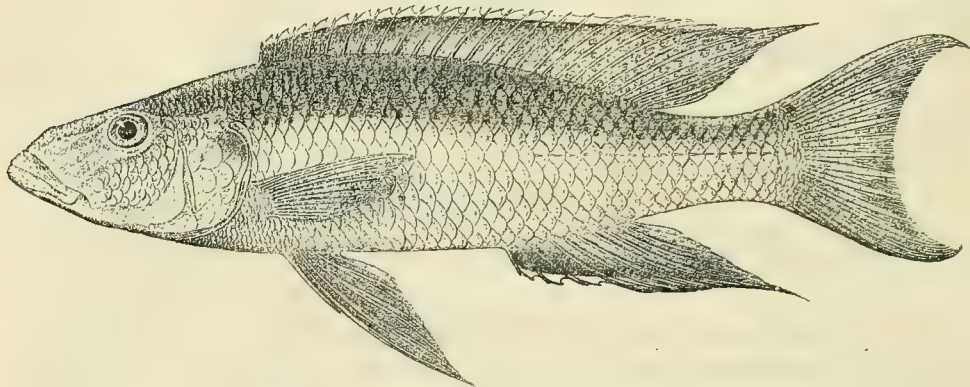
*Paratilapia cærulea*, Bouleng. Ann. & Mag. N. H. (8) ii. 1908, p. 240.

Depth of body 4 times in total length, length of head  $3\frac{1}{4}$  times. Head  $2\frac{1}{2}$  times as long as broad; lower jaw feebly projecting; snout with convex upper profile,  $1\frac{1}{2}$  times as long as broad, as long as post-ocular part of head; eye  $2\frac{1}{2}$  times in length of snout, 6 times in length of head,  $1\frac{1}{2}$  times in interorbital width; mouth widely separated from

\* 18+18 or 18+20 in *C. longiceps*, 19+20 in *C. esox*.

vertical of anterior border of eye; teeth in 4 series; 5 series of scales on the cheek. Gill-rakers moderately long, 11 on lower part of anterior arch. Dorsal XVI 13; spines rather feeble, increasing in length to the last, which measures  $\frac{1}{3}$  length of head. Anal III 10; third spine shorter than last dorsal. Soft dorsal, anal, and ventrals much produced, ending in filaments. Pectoral  $\frac{3}{4}$  length of head. Caudal scaly, with deep crescentic emargination. Caudal peduncle nearly twice as long

Fig. 295.

*Champsochromis cœruleus.*Type.  $\frac{1}{2}$ .

as deep. Scales finely denticulate, 38  $\frac{4-5}{12}$ ; lateral lines  $\frac{23}{17}$ . Blue or greenish blue, darker above; dorsal and anal fins edged with orange, the former and the caudal with small round brown spots edged with red.

Total length 255 millim.

Lake Nyassa.

1. Type.

L. Nyassa.

Capt. E. L. Rhoades (P.).

## 2. CHAMPSOCHROMIS LONGICEPS.

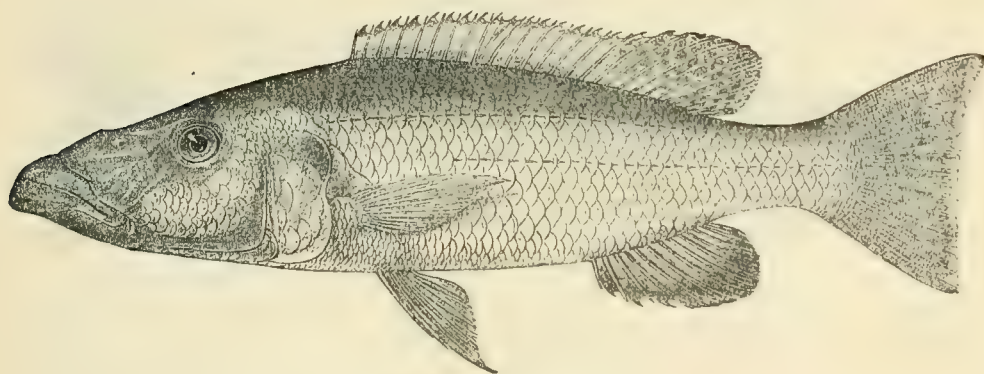
*Hemichromis longiceps*, Günth. Proc. Zool. Soc. 1864, p. 313.

*Paratilapia longiceps*, Bouleng. Proc. Zool. Soc. 1898, p. 146; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 270.

Depth of body 4 to  $4\frac{1}{2}$  times in total length, length of head  $2\frac{2}{3}$  to 3 times. Head 3 to  $3\frac{1}{3}$  times as long as broad; lower jaw feebly projecting; snout with convex upper profile, twice as long as broad, longer than postocular part of head; eye 2 to  $3\frac{1}{3}$  times in length of snout, 5 to  $6\frac{1}{2}$  times in length of head,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times in interorbital width;

mouth widely separated from vertical of anterior border of eye; teeth in 2 or 3 series; 3 or 4 series of scales on the cheek. Gill-rakers moderately long, 15 to 17 on lower part of anterior arch. Dorsal XVI-XVIII 11-12; spines rather feeble, increasing in length to the last, which measures  $\frac{1}{5}$  to  $\frac{1}{4}$  length of head; longest soft rays about  $\frac{1}{3}$  length of head. Anal III 9-10; third spine as long as and stronger than last dorsal. Pectoral  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Ventral not reaching

Fig. 296.

*Champsochromis longiceps.*L. Nyassa.  $\frac{1}{3}$ .

vent. Caudal scaly, slightly emarginate. Caudal peduncle nearly twice as long as deep. Scales finely denticulate, 38-41  $\frac{32-4}{11-13}$ ; lateral lines  $\frac{24-28}{18-30}$ . Silvery, olive or blackish on the back; a dark lateral stripe sometimes present; a blackish opercular spot; fins greyish, uniform, or dorsal and caudal with round blackish spots.

Total length 330 millim.

Lake Nyassa and Upper Shiré River.

1-2. Skins, types.	L. Nyassa.	Sir J. Kirk (C.).
3-5. Ad. & hgr.	"	Prof. J. E. S. Moore (C.).
6. Skel.	"	"
7. Ad.	"	Capt. E. L. Rhoades (P.).
8. Ad.	Upper Shiré.	Dr. Percy Rendall (C.); Sir H. H. Johnston (P.).

### 3. CHAMPSOCHROMIS ESOX.

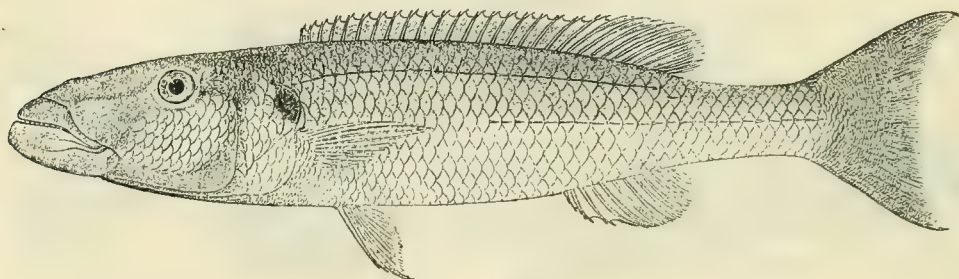
*Paratilapia esox*, Bouleng. Ann. & Mag. N. H. (8) ii. 1908, p. 240.

Depth of body  $4\frac{3}{4}$  to  $5\frac{1}{4}$  times in total length, length of head 3 times. Head 3 times as long as broad; lower jaw feebly projecting; snout with



convex upper profile, twice as long as broad, longer than postocular part of head; eye  $3\frac{1}{2}$  to 4 times in length of snout, 7 to 8 times in length of head, twice in interorbital width; mouth widely separated from vertical of anterior border of eye; teeth in 2 or 3 series; 5 or 6 series of scales on the cheek. Gill-rakers rather short, 15 or 16 on lower part of anterior arch. Dorsal XVIII-XX 12-13; spines weak, increasing in length to the last, which measures  $\frac{1}{5}$  length of head; longest soft rays

Fig. 297.

*Champsochromis esox.*Type.  $\frac{1}{3}$ .

about  $\frac{1}{4}$  length of head. Anal III 10-11; third spine nearly as long as and stronger than last dorsal. Pectoral  $\frac{1}{2}$  length of head. Ventral not reaching vent. Caudal scaly, feebly but distinctly emarginate. Caudal peduncle 2 to  $2\frac{1}{2}$  times as long as deep. Scales finely denticulate, 43-45  $\frac{5-6}{12-13}$ ; lateral lines  $\frac{24-27}{16-25}$ . Bright silvery white, except on the back, which is dark green; a black opercular spot; fins bluish grey, dorsal and anal edged with orange.

Total length 370 millim.

Lake Nyassa.

1-2. Types.

L. Nyassa.

Capt. E. L. Rhoades (P.).

3. Skel.

„

„

## 17. BATHYBATES.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 15, and Poiss. Bass. Congo, p. 429 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 364; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 565.

Body elongate; scales cycloid, small, and irregular. Teeth in jaws fang-like, in 2 to 4 series, the inner depressible, hinged at the base; maxillary bone folding under the præorbital. Dorsal with 13 to 17

spines, anal with 3; 14 to 18 soft rays in the anal. Occipital and parietal crests strong, not extending forward to beyond posterior part of interorbital region. Vertebrae 35-36\*.

Lake Tanganyika.

*Synopsis of the Species.*

I. Spinous dorsal not notched, the posterior spines subequal; 3 to 5 series of teeth in the upper jaw, 3 in the lower.

A. Interocular width less than diameter of eye.

D. XV-XVI 11-12; A. III 14; Sc. 65-75  $\frac{6-7}{25-30}$ ;

12-13 gill-rakers on lower part of anterior

arch . . . . . 1. *B. graueri*, Sldr., p. 437.

D. XIV-XV 15-16; A. III 16-17; Sc. 78-100

$\frac{7-8}{35-38}$ ; 13-15 gill-rakers . . . . . 2. *B. ferox*, Blgr., p. 438.

D. XIV 14; A. III 17; Sc. 85  $\frac{10}{35}$ ; 9 gill-rakers . . . . . 3. *B. horni*, Sldr., p. 440.

B. Interocular width at least equal to diameter of eye.

D. XV 14; A. III 14-15; Sc. 120-125  $\frac{12-13}{30}$ ;

12-13 gill-rakers . . . . . 4. *B. vittatus*, Blgr., p. 440.

D. XVI-XVII 16-17; A. III 17-18; Sc. 140-150

$\frac{11}{25-32}$ ; 16-19 gill-rakers . . . . . 5. *B. fasciatus*, Blgr., p. 441.

II. Spinous dorsal notched, the last spine twice as long as the penultimate;

2 or 3 series of teeth in the upper jaw, 2 in the lower.

D. XIII 15-16; A. III 16-17; Sc. 90-95  $\frac{9-10}{27-30}$ ;

11-12 gill-rakers . . . . . 6. *B. minor*, Blgr., p. 442.

1. BATHYBATES GRAUERI.

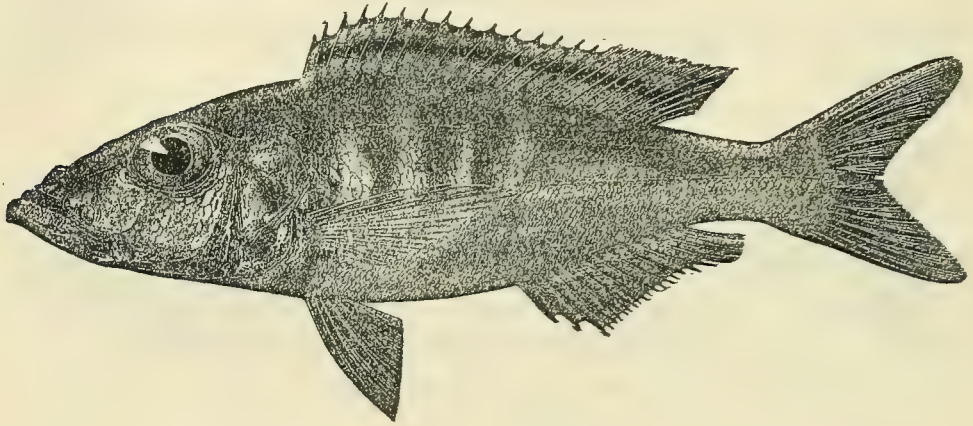
Steind. Sitzb. Ak. Wien, cxx. i. 1911, p. 1171, pl. i.

Depth of body  $3\frac{1}{3}$  to  $3\frac{2}{3}$  times in total length, length of head  $2\frac{1}{2}$  times. Snout longer than postocular part of head; lower jaw projecting; eye  $1\frac{2}{5}$  to  $1\frac{3}{4}$  times in length of snout,  $3\frac{3}{5}$  to 4 times in length of head, nearly twice interorbital width; mouth not extending to below anterior border of eye; 4 series of teeth in the upper jaw; 7 series of scales on the cheek. 12 or 13 gill-rakers on lower part of anterior arch. Dorsal XV-XVI 11-12; spines subequal,  $\frac{2}{7}$  length of head; longest soft rays  $\frac{2}{5}$  length of head. Anal III 14; spines slender, third as long as dorsals. Pectoral about  $\frac{2}{3}$  length of head, extending to vertical of origin of anal.

\*  $16-17+19=35-36$  in *B. ferox*,  $16+20=36$  in *B. minor*.

Ventral not reaching anal. Caudal deeply notched. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times as long as deep. Scales 65–75  $\frac{6-7}{25-30}$ ; lateral lines  $\frac{56-60}{31-43}$ . Purplish-grey spots forming 4 or 5 vertical bars on the anterior part of

Fig. 298.

*Batthybates graueri.*

Type, after Steindachner (*l. c.*).  $\frac{1}{2}$ .

the body, 5 longitudinal bands on the posterior part; dorsal edged with purple, and with a purple longitudinal streak.

Total length 202 millim.

Lake Tanganyika.—Types in Vienna Museum.

## 2. BATHYBATES FEROX.

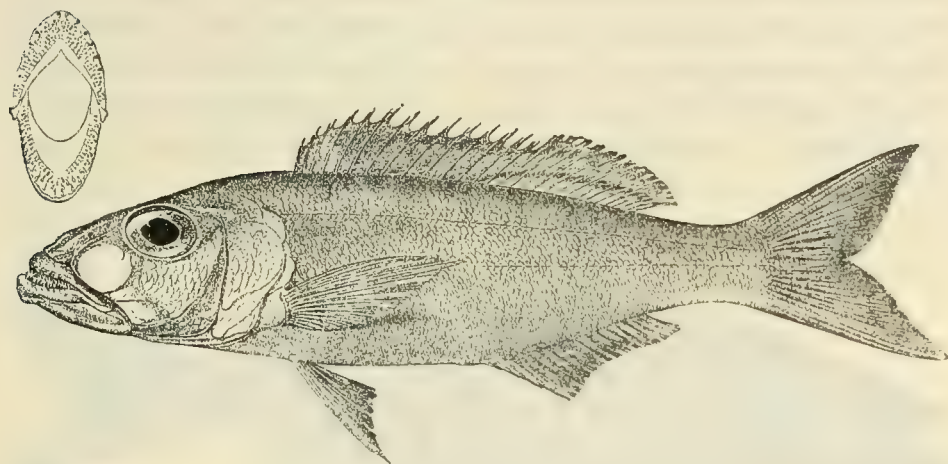
Bouleng. Tr. Zool. Soc. xv. 1898, p. 15, pl. iv. fig. 2, and Poiss. Bass. Congo, p. 429 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 364, pl. vii. fig. 3; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 564; Steind. Sitzb. Ak. Wien, cxx. i. 1911, p. 1177.

Depth of body  $3\frac{2}{3}$  to  $4\frac{1}{2}$  times in total length, length of head  $2\frac{4}{5}$  to 3 times. Head  $2\frac{1}{2}$  to 3 times as long as broad; snout with convex upper profile, much longer than broad, as long as or a little longer than postocular part of head; lower jaw projecting; eye  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times in length of snout,  $3\frac{1}{2}$  to 4 times in length of head, exceeding interorbital width; mouth not extending quite to below anterior border of eye; 4 series of teeth in upper jaw, 3 in lower; 5 to 7 series of scales on the cheek. Gill-rakers moderately long, 13 to 15 on lower part of anterior arch. Dorsal XIV–XV 15–16; spines rather feeble, subequal from the fifth,



$\frac{1}{4}$  to  $\frac{2}{7}$  length of head; longest soft rays about  $\frac{1}{3}$  length of head. Anal III 16-17; spines feeble, third shorter than last dorsals. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head, not extending to vertical of origin of anal.

Fig. 299.

*Bathybates ferox.*

Type (Tr. Z. S. 1898).  $\frac{1}{2}$ .

Ventral not reaching vent. Caudal deeply notched. Caudal peduncle nearly twice as long as deep. Scales very small and irregular on the back and below the lateral lines, 78-100  $\frac{7-8}{35-38}$ ; lateral lines  $\frac{70-78}{38-44}$ . Bluish grey or greenish blue above, white beneath; longitudinal series of dark spots may be present on the body, the largest above the upper lateral line; dorsal and anal bluish grey, pectorals, ventrals, and caudal yellowish; one or two dark streaks on the dorsal.

Total length 320 millim.

Lake Tanganyika.

1. Type.	Kinyamkolo.	Prof. J. E. S. Moore (C.).
2. Ad.	Niamkolo.	Dr. W. A. Cunningham (C.).
3. Ad.	Kasalakave.	"
4. Skel.	"	"
5. Ad.	S. end of Lake.	Prof. J. E. S. Moore (C.).
6. Ad.	Kalambo.	"
7. Ad.	W. coast of Lake.	"
8. Ad.	Usambura.	"
9. Hgr.	Kilewa Bay.	Dr. L. Stappers (C.).

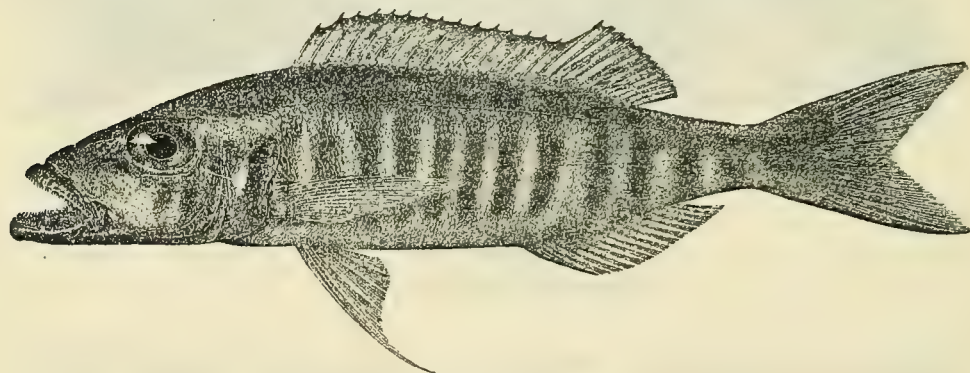


## 3. BATHYBATES HORNI.

Steind. Sitzb. Ak. Wien, exx. i. 1911, p. 1173, pl. ii.

Depth of body  $4\frac{1}{3}$  times in total length, length of head  $2\frac{8}{9}$  times. Snout longer than postocular part of head; lower jaw projecting; eye  $3\frac{2}{3}$  times in length of head, exceeding interorbital width; mouth not extending to below anterior border of eye; 3 series of teeth in the upper jaw; 9 series of scales on the cheek. 9 gill-rakers on lower part of anterior arch. Dorsal XIV 14; spines subequal,  $\frac{2}{7}$  length of head;

Fig. 300.



*Bathybates horni*.

Type, after Steindachner (*l. c.*).  $\frac{1}{2}$ .

longest soft rays  $\frac{1}{3}$  length of head. Anal III 17; spines slender, third as long as dorsals. Pectoral about  $\frac{2}{3}$  length of head, not extending to vertical of origin of anal. Ventral nearly reaching anal. Caudal deeply notched. Caudal peduncle twice as long as deep. Scales  $85\frac{10}{35}$ ; lateral lines  $\frac{80}{47}$ . Head with 4, body with 14 sharply defined dark brown vertical bars; dorsal fin with a dark edge.

Total length 240 millim.

Lake Tanganyika.—Type in Vienna Museum.

## 4. BATHYBATES VITTATUS.

Bouleng. Rev. Zool. Afr. iii. 1914, p. 445.

Depth of body  $4\frac{1}{3}$  times in total length, length of head 3 times. Head  $2\frac{1}{2}$  times as long as broad; snout with slightly convex upper profile, much longer than broad, longer than postocular part of head; lower jaw projecting; eye twice in length of snout,  $4\frac{1}{2}$  times in length

of head, equal to interocular width; mouth not extending to below anterior border of eye; 4 or 5 series of teeth in upper jaw, 3 in lower; 8 or 9 series of scales on the cheek. Gill-rakers short, 12-13 on lower part of anterior arch. Dorsal XV 14; spines rather feeble, subequal from the fifth or sixth, about  $\frac{1}{4}$  length of head, penultimate a little shorter than last; longest soft rays about  $\frac{1}{3}$  length of head. Anal III 14-15; spines feeble, third barely  $\frac{2}{3}$  length of longest dorsals. Pectoral  $\frac{2}{3}$  length of head, not extending to vertical of origin of anal. Ventral  $\frac{2}{3}$  the distance between its base and vent. Caudal deeply notched. Caudal peduncle twice as long as deep. Scales 120-125  $\frac{12-13}{30}$ ; lateral lines  $\frac{76-80}{44-45}$ . Brownish above, whitish beneath, with 4 or 5 dark brown longitudinal bands on each side; dorsal with blackish spots; ventrals and anal yellow.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

1. One of the types. Kilewa Bay. Dr. L. Stappers (C.).

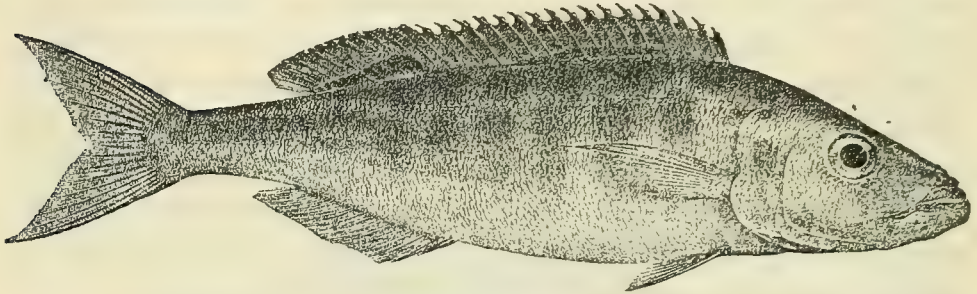
#### 5. BATHYBATES FASCIATUS.

Bouleng. Ann. & Mag. N. H. (7) vii. 1901, p. 3, Poiss. Bass. Congo, p. 430 (1901), and Tr. Zool. Soc. xvi. 1901, p. 153, pl. xvii. fig. 2; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 365; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 564; Steind. Sitzb. Ak. Wien, cxx. i. 1911, p. 1175.

Depth of body  $4\frac{1}{2}$  to  $4\frac{2}{3}$  times in total length, length of head 3 to  $3\frac{1}{2}$  times. Head  $2\frac{1}{3}$  to  $2\frac{1}{2}$  times as long as broad; snout with convex upper profile, much longer than broad, as long as postocular part of head; lower jaw projecting; eye  $1\frac{3}{4}$  to 2 times in length of snout, 4 to 5 times in length of head,  $1\frac{1}{5}$  to  $1\frac{1}{2}$  times in interorbital width; mouth not extending to below anterior border of eye; 4 series of teeth in upper jaw, 3 in lower; 8 to 11 series of scales on the cheek. Gill-rakers moderately long, 16 to 19 on lower part of anterior arch. Dorsal XVI-XVII 16-17; spines rather feeble, subequal from the fifth, or penultimate a little shorter than last, about  $\frac{1}{4}$  length of head; longest soft rays about  $\frac{1}{3}$  length of head. Anal III 17-18; spines feeble, third shorter than longest dorsals. Pectoral  $\frac{2}{3}$  length of head, not extending to vertical of origin of anal. Ventral not  $\frac{1}{2}$  as long as the distance between its base and vent. Caudal deeply notched. Caudal peduncle 2 to  $2\frac{1}{2}$  times as long as deep. Scales as in *B. ferox*, but smaller still, 140-150  $\frac{11}{25-32}$ ; lateral lines  $\frac{75-80}{45-48}$ . Brownish above, white beneath; a series of large, rounded, blackish spots on each side of the back above the lateral line, alternating with a

series of vertical blackish bars on each side of the body; on the tail, from below the middle of the dorsal, the spots unite into a band which extends to the caudal, and the vertical bars likewise fuse to form a

Fig. 301.

*Bathybates fasciatus.*

Type (Tr. Z. S. 1901).  $\frac{1}{2}$ .

lateral band; a blackish spot on the opercle, another at the base of the ventral; two black bands on the dorsal, a basal and a marginal, on only one, the marginal.

Total length 335 millim.

Lake Tanganyika.

1. Type.	W. coast of Lake.	Prof. J. E. S. Moore (C.).
2. Ad.	Niamkolo.	Dr. W. A. Cunningham (C.).

#### 6. BATHYBATES MINOR.

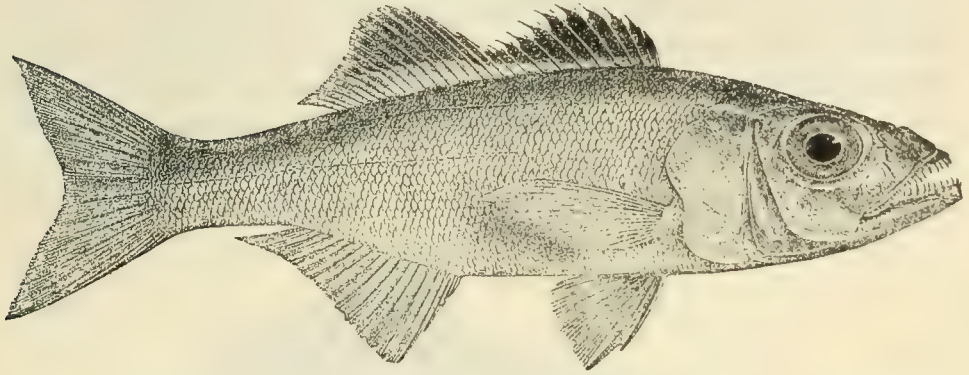
Bouleng. Tr. Zool. Soc. xvii. 1906, p. 564, pl. xxxviii. fig. 1.

Depth of body  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times in total length, length of head  $2\frac{3}{4}$  to 3 times. Head  $2\frac{3}{4}$  to  $3\frac{1}{2}$  times as long as broad; snout with convex upper profile, as long as or a little shorter than postocular part of head; lower jaw projecting; eye slightly shorter than snout,  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times in length of head, slightly exceeding interorbital width; mouth extending to below anterior border of eye; 2 or 3 series of teeth in upper jaw, 2 in lower; 5 series of scales on the cheek. Gill-rakers rather short, 11 or 12 on lower part of anterior arch. Dorsal XIII 15-16, deeply notched, the eighth to eleventh spines being only about half as long as the fifth and last, which are the longest and measure about  $\frac{2}{7}$  length of head; longest soft rays  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 16-17; spines feeble. Pectoral  $\frac{2}{3}$  length of head. Ventral not reaching vent. Caudal deeply notched. Caudal peduncle



$1\frac{1}{2}$  to  $1\frac{2}{3}$  times as long as deep. Scales small and very irregular, 90–95  $\frac{9-10}{27-30}$ ; lateral lines  $\frac{63-71}{37-39}$ . Brown above, silvery on the sides and

Fig. 302.

*Bathybates minor.*

Type (Tr. Z. S. 1906).  $\frac{5}{7}$ .

below; spinous dorsal black, white at the base; a black streak along the middle of the soft dorsal, which is white below the streak.

Total length 160 millim.

Lake Tanganyika.

1. Type.	Kituta.	Dr. W. A. Cunningham (C.).
2. Type.	Lofu.	"
3–6. Types.	Usambura Market.	Prof. J. E. S. Moore (C.).
7–13. Yg.	Mbete.	Dr. W. A. Cunningham (C.).
14. Ad.	Kilewa Bay.	Dr. L. Stappers (C.).
15. Skel.	Albertville.	Capt. Hecq (C.).

### 18. HAPLOTAXODON.

Bouleng. Tr. Zool. Soc. xvii. 1906, p. 565.

Body elongate, strongly compressed, covered with small ctenoid scales; two lateral lines, the upper complete. Mouth nearly vertical, directed upwards, with a single series of small, equal, conical teeth. Maxillary exposed at the end. Dorsal with 17 or 18 spines, anal with 3. Occipital and parietal crests strong, extending to between the orbits. Vertebrae 38 (19+19).

Lake Tanganyika.

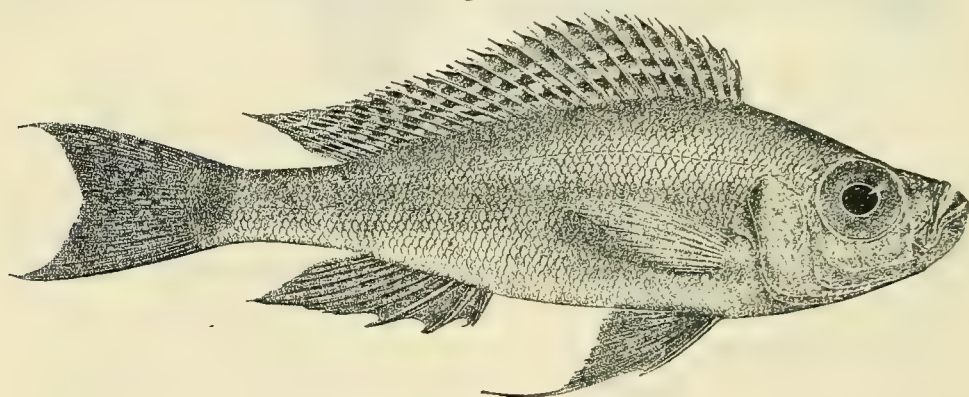


## 1. HAPLOTAXODON MICROLEPIS.

Bouleng. t. c. p. 566, pl. xxxviii. fig. 2.

Depth of body  $3\frac{1}{2}$  to  $3\frac{1}{2}$  times in total length, length of head  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times. Head about twice as long as broad; snout much shorter than eye, chin very prominent; eye very large,  $2\frac{3}{4}$  to 3 times in length of head (chin included), much exceeding interorbital width; mouth not extending to below anterior border of eye; 2 or 3 series of scales on the cheek. Gill-rakers long and slender, closely set, 18 to 21 on lower part of anterior arch. Dorsal XVII-XVIII 11-13; spines strong, equal in length from the ninth or tenth,  $\frac{1}{2}$  length of head; longest soft rays about  $\frac{2}{3}$  length of head.

Fig. 303.



*Haplotaxodon microlepis.*

Type (Tr. Z. S. 1901).  $\frac{5}{8}$ .

Anal III 9; spines very strong, third  $\frac{1}{2}$  length of head. Pectoral slightly shorter than head, not extending to origin of anal. Ventral produced into a filament extending beyond origin of anal. Caudal deeply notched. Caudal peduncle twice as long as deep. Scales 70-77  $\frac{6-7}{23-24}$ ; lateral lines  $\frac{65-77}{36-44}$ ; 4 or 5 series of scales between the lateral lines in front. Olive or grey above, shading off to silvery white below; four or five dark bars may be present across the back, and a dark spot at the base of the caudal; dorsal and caudal grey-brown, with yellowish-white large round spots; anal and ventrals white, tinged with yellow.

Total length 210 millim.

Lake Tanganyika.

1. Type.	Niamkolo.	Dr. W. A. Cunningham (C.).
2. Type.	Kasanga.	"
3. Skel.	Kasawa.	"
4. Ad.	Tulo.	Dr. L. Stappers (C.).

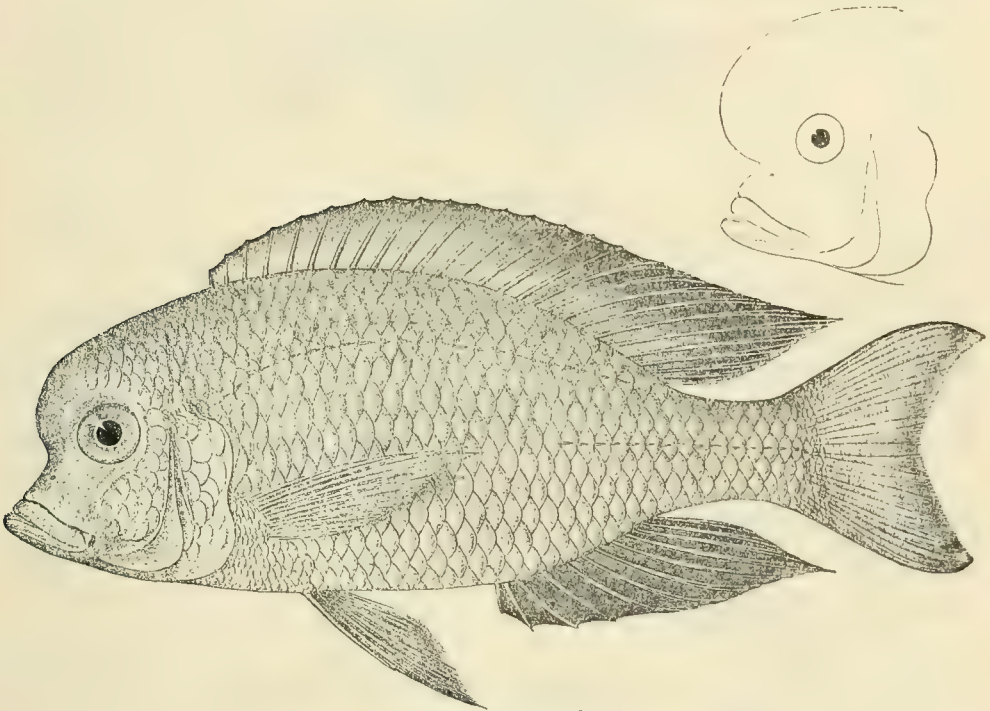
## 19. CYRTOCARA.

Bouleng. Ann. & Mag. N. H. (7) x. 1902, p. 69 ; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 287.

Body moderately elongate; scales ctenoid; two incomplete lateral lines. Jaws with broad bands of conical, slightly curved teeth, the outer enlarged and pointing outwards. End of maxillary exposed. Dorsal fin with 15 or 16 spines, anal with 3 or 4; membrane between dorsal and anal spines with rectilinear edge, not forming lappets.

Lake Nyassa.

Fig. 304.



*Cyrtocara moorii*.

Type, and outline of head of second specimen.  $\frac{5}{7}$ .

## 1. CYRTOCARA MOORII.

Bouleng. t. c. p. 70 ; Pellegr. l. c.

Depth of body  $2\frac{1}{3}$  to  $2\frac{1}{2}$  times in total length, length of head  $3\frac{1}{4}$  to  $3\frac{2}{5}$  times. Head twice as long as broad; forehead with a strong dermal gibbosity; snout short, its profile descending very steeply; lower jaw projecting; eye  $3\frac{1}{2}$  to 4 times in length of head, much less than inter-orbital width; mouth extending to below anterior border of eye; 3 or

4 series of scales on the cheek. Gill-rakers short, 10 on lower part of anterior arch. Dorsal XV–XVI 11; spines rather feeble, increasing in length to the last, which measures nearly  $\frac{1}{2}$  length of head; longest soft rays as long as head. Anal III–IV 8–9; last spine shorter than last dorsal. Pectoral as long as or a little longer than head, extending to vertical of origin of anal, or not quite so far. Ventral as long as or longer than head. Caudal densely scaled, deeply notched. Caudal peduncle a little longer than deep. Scales very finely, sometimes rather indistinctly denticulate, 33–36  $\frac{3}{11}$ ; lateral lines  $\frac{21-25}{15-16}$ . Brown or blue-black; tail edged with orange in life.

Total length 185 millim.

Lake Nyassa.

1. Type.	L. Nyassa.	Prof. J. E. S. Moore (C.).
2. Ad.	„	Capt. E. L. Rhoades (P.).

## 20. ECTODUS.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 21, and Poiss. Bass. Congo, p. 437 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 367 (part.).

Body moderately elongate; scales ctenoid; two incomplete lateral lines. Teeth small, conical, in two or three series, those of the outer series in the lower jaw directed outwards, perpendicular to the inner. Maxillary entirely folding under the præorbital. A large papillose pad on each side of the pharynx, forming a strong protuberance in front of the upper part of the branchial arches. Dorsal with 13 or 14 spines, anal with 3. Occipital and parietal crests low, extending to between the orbits. Vertebrae 36 (17+19).

Lake Tanganyika.

Connected with *Pelmatochromis* through *P. macrops*, *P. stappersii*, and *P. pleurospilus*.

### 1. ECTODUS DESCAMPSII.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 21, fig., 1899, p. 90, pl. xix. fig. 2, Ann. Mus. Congo, Zool. i. p. 144, pl. liv. fig. 2 (1900), and Poiss. Bass. Congo, p. 438 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 367; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 568.

Depth of body  $3\frac{1}{3}$  to  $3\frac{4}{5}$  times in total length, length of head 3 times. Head twice as long as broad, with curved upper profile; snout rounded, as long as broad or a little broader than long, shorter than eye, which



is  $2\frac{1}{2}$  to  $2\frac{4}{5}$  times in length of head and exceeds interorbital width; mouth extending to between nostril and eye; 2 or 3 series of scales on the cheek. Gill-rakers short, 11–12 on lower part of anterior arch. Dorsal XIII–XIV 13–15; spines weak, subequal from the eighth or increasing in length to the last, which measures  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head; soft rays not or but slightly longer than the spines. Anal III 8–11. Pectoral as long as or a little longer than head, extending to vertical of origin of anal. Ventral reaching vent or a little beyond. Caudal with

Fig. 305.

*Ectodus descampsii.*Moliro (Tr. Z. S. 1899).  $\frac{8}{9}$ .

deep crescentic notch. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times as long as deep. Scales finely denticulate, 34–38  $\frac{3}{10-11}$ ; lateral lines  $\frac{27-31}{14-19}$ . Brown above, yellowish beneath; a dark spot sometimes present on the posterior part of the spinous portion.

Total length 95 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

1–2. Ad.	Sumbu.	Dr. W. A. Cunningham (C.).
3. Skel.	”	”
4. Ad.	Uvira.	Dr. L. Stappers (C.).

## 21. ENANTIOPUS.

*Ectodus*, part., Bouleng. Tr. Zool. Soc. xv. 1898, p. 21, and Poiss. Bass. Congo, p. 437 (1900); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 367.

*Enantiopus*, Bouleng. Tr. Zool. Soc. xvii. 1906, p. 569.

Body elongate; scales ctenoid; two incomplete lateral lines. Teeth small, conical, in two series, those of the outer series of the lower jaw directed outwards, nearly perpendicular to the inner. Maxillary nearly entirely folding under the præorbital. A large papillose pad on each side of the pharynx, forming a strong protuberance in front of the upper part of the branchial arches. Dorsal with 13 to 15 spines, anal with 3.



Inner rays of ventrals the longest. Occipital and parietal crests very low, extending to between the orbits. Vertebrae 38 (14 + 24).

Lake Tanganyika.

Two species :—

Depth of body 5 to  $5\frac{1}{2}$  times in total length ;

snout with straight or slightly convex

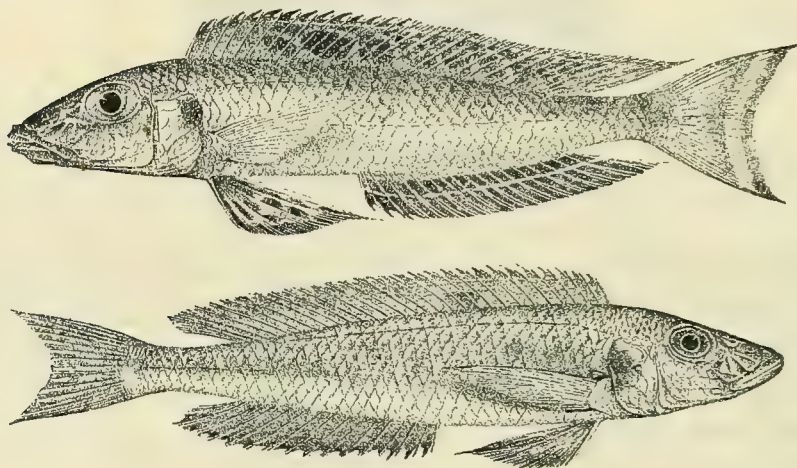
upper profile; Sc. 40–44  $\frac{3-4}{9-10}$  . . . . . 1. *E. melanogenys*, Blgr., p. 448.

Depth of body  $4\frac{1}{2}$  times in total length ; snout

with strongly curved upper profile ; Sc.

38–40  $\frac{3\frac{1}{2}-4}{9-10}$  . . . . . 2. *E. ochrogenys*, Blgr., p. 449.

Fig. 306.



*Enantiopus melanogenys*.

Male and female (Tr. Z. S. 1899 and 1901).

### 1. ENANTIOPUS MELANOGENYS.

*Ectodus melanogenys*, Bouleng. Tr. Zool. Soc. xv. 1898, p. 21, fig., 1889, p. 91, pl. xix. fig. 3, Ann. Mus. Congo, Zool. i. p. 145, pl. liv. fig. 3 (1900), Poiss. Bass. Congo, p. 439 (1901), and Tr. Zool. Soc. xvi. 1901, p. 154, pl. xix. fig. 4 ; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 368.

*Ectodus longianalis*, Bouleng. Tr. Zool. Soc. xv. 1899, p. 91, pl. xix. fig. 4, Ann. Mus. Congo, Zool. i. p. 145, fig. 4, and Poiss. Bass. Congo, p. 439.

*Enantiopus melanogenys*, Bouleng. Tr. Zool. Soc. xvii. 1906, p. 569.

*Enantiopus longianalis*, Bouleng. l. c.

Depth of body 5 to  $5\frac{1}{2}$  times in total length, length of head 3 to  $3\frac{1}{2}$  times. Head 2 to  $2\frac{1}{3}$  times as long as broad ; snout with straight or slightly convex upper profile, a little longer than broad,  $1\frac{1}{5}$  (young) to

$1\frac{2}{3}$  times as long as eye, which is 3 (young) to 4 times in length of head and equals or exceeds interorbital width; mouth extending to between nostril and eye; 3 series of scales on the cheek. Gill-rakers short, 11 to 15 on lower part of anterior arch. Dorsal XIII–XV 15–17; spines feeble, increasing in length to the last, which measures  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; last soft rays produced in the adult, at least  $\frac{2}{3}$  length of head. Anal III 13–17; third spine  $\frac{1}{3}$  length of head. Pectoral as long as or a little shorter than head, extending to vertical of origin of anal. Ventral reaching origin of anal or a little beyond. Caudal with deep crescentic notch. Caudal peduncle twice as long as deep. Scales finely denticulate, 40–44  $\frac{3-4}{9-10}$ ; lateral lines  $\frac{22-31}{11-18}$ . Grey or brown above, with or without a pale blue spot on each scale, white beneath; a lateral series of dark spots may be present; a dark opercular spot; adult with the chin and the branchiostegal membrane blackish; a large dark spot may be present in the middle of the spinous dorsal; ventral and anal edged with black in the adult; male with large black and white ocelli on the spinous dorsal and oblique dark bands on the soft; caudal with or without crescentic dark bands.

Total length 135 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

1. Ad.	Moliro.	Capt. Lemaire (C.).
2–3. Ad.	„	Dr. W. A. Cunningham (C.).
4–5. Ad.	Mbete.	„
6–7. Hgr.	Kigoma.	„
8. Ad.	Semburi.	„
9. Ad.	Rumonge.	„
10–12. Ad.	Usambura.	Prof. J. E. S. Moore (C.).
13. Skel.	„	„
14. Ad.	Tulo.	Dr. L. Stappers (C.).

## 2. ENANTIOPUS OCHROGENYS.

Bouleng. Rev. Zool. Afr. iii. 1914, p. 444.

Depth of body  $4\frac{1}{2}$  times in total length, length of head  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times. Head 2 to  $2\frac{1}{3}$  times as long as broad; snout with strongly curved upper profile, as long as broad, as long as eye, which is 3 times in length of head and  $\frac{2}{3}$  interorbital width; mouth extending to between nostril and eye; 3 series of scales on the cheek. Gill-rakers short, 10 or 11 on lower part of anterior arch. Dorsal XIV 14–15; spines feeble,

subequal from the eighth, which measures  $\frac{1}{3}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Anal III 13; third spine  $\frac{1}{4}$  length of head. Pectoral a little shorter than head, extending to vertical of origin of anal. Inner rays of ventral produced, extending beyond origin of anal. Caudal with deep crescentic notch. Caudal peduncle twice as long as deep. Scales finely denticulate, 38–40  $\frac{3\frac{1}{2}-4}{9-10}$ ; lateral lines  $\frac{26-28}{17-18}$ . Brownish above, yellowish beneath, throat and breast white; lips and chin bright yellow; two series of elongate brown spots on the sides of the body; a blackish opercular spot; a blackish spot at base of caudal; dorsal white with bright yellow spots and a purplish streak within the upper border; anal with a purplish streak between two bright yellow ones; ventral and caudal with bright yellow spots, the latter with two purplish crescentic bands.

Total length 95 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

1. One of the types. Kilewa Bay. Dr. L. Stappers (C.).

*Ectodus albinus*, Steind. Anz. Ak. Wien, 1909, p. 427, from L. Tanganyika, probably belongs to *Enantiopus*, differing from *E. ochrogenys* chiefly in the number of dorsal spines. D. XII–XIII 13–15. A. III 12–14. Sc. 37–38. Lat. l.  $\frac{25-29}{9-17}$ .

## 22. STAPPERSIA.

Bouleng. Rev. Zool. Afr. iii. 1914, p. 445.

Body elongate; scales ctenoid; two incomplete lateral lines. Mouth small, horizontal, very protractile; teeth very small, conical, in 4 or 5 series. Maxillary exposed at the end. A large papillose pad on each side of the pharynx, forming a strong protuberance in front of the upper part of the branchial arches. Dorsal with 13 to 15 spines, anal with 3. Inner rays of ventrals the longest.

Lake Tanganyika.

### 1. STAPPERSIA SINGULARIS.

Bouleng. l. c.

Depth of body  $4\frac{1}{3}$  to  $4\frac{1}{2}$  times in total length, length of head 3 times. Head twice as long as broad; snout with strongly curved upper profile, a little longer than eye, which is oval, 3 times in length of head, and much exceeds interorbital width; mouth extending to between nostril



and eye; 3 series of scales on the cheek. Gill-rakers short and broad, rounded, 10 or 11 on lower part of anterior arch. Dorsal XIII–XV 13–14; spines feeble, subequal from the sixth or seventh,  $\frac{1}{3}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Anal III 13–14; third spine shorter than longest dorsals. Pectoral as long as head, extending beyond vertical of origin of anal. Ventral extending beyond origin of anal. Caudal with deep crescentic notch. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times as long as deep. Scales strongly denticulate, 37–38  $\frac{3}{10}$ ; lateral lines  $\frac{25-29}{17}$ . Yellowish or brownish above, with small brown spots; a lateral series of larger round dark brown spots, the last at the base of the caudal; a black opercular spot; a purplish-brown streak along the upper part of the dorsal and of the anal, and on each lobe of the caudal.

Total length 90 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

1. One of the types. Tulo. Dr. L. Stappers (C).

### 23. XENOTILAPIA.

Bouleng. Tr. Zool. Soc. xv. 1899, p. 92, Proc. Zool. Soc. 1900, p. 3, and Poiss. Bass. Congo, p. 441 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 369.

Body elongate; scales ctenoid; three lateral lines, the upper complete, the others incomplete. Mouth small, horizontal, very protractile; teeth very small and conical, in two or three series, the outer in the lower jaw directed forwards and perpendicularly to the others. Maxillary folding under the præorbital. A large papillose pad on each side of the pharynx, forming a protuberance in front of the upper part of the branchial arches. Dorsal with 13 to 15 spines, anal with 3. Inner rays of ventrals the longest. Occipital and parietal crests strong, extending to between the orbits. Vertebrae 34–35 (13–14 + 20–22).

Lake Tanganyika.

Two species:—

Depth of body  $3\frac{2}{3}$  to  $4\frac{1}{2}$  times in total length;

9 gill-rakers on lower part of anterior arch; A. III 11–12 . . . . .

1. *X. sima*, Blgr., p. 452.

Depth of body  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times in total length;

15–17 gill-rakers; A. III 7–8 . . . . .

2. *X. ornatipinnis*, Blgr., p. 453.

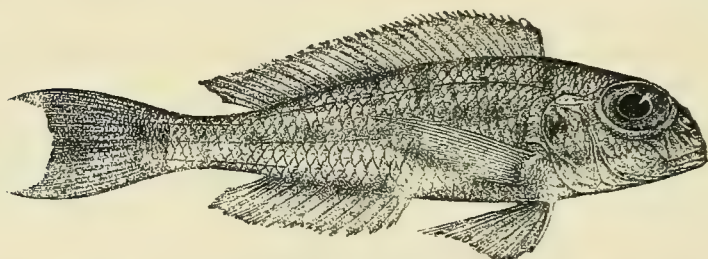


## 1. XENOTILAPIA SIMA.

Bouleng. Tr. Zool. Soc. xv. 1899, p. 92, pl. xix. fig. 5, Ann. Mus. Congo, Zool. i. p. 147, pl. liv. fig. 5 (1900), and Poiss. Bass. Congo, p. 441 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 370; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 569.

Depth of body  $3\frac{3}{4}$  to  $4\frac{1}{2}$  times in total length, length of head 3 to  $3\frac{1}{4}$  times. Snout very short and deep, with very steep convex upper profile; eye very large, oval,  $2\frac{1}{2}$  times in length of head and much exceeding interorbital width; mouth nearly straight, horizontal, extending to below anterior border of eye; 3 or 4 series of scales on the cheek. Gill-rakers very short, broad, truncate, 9 on lower part of anterior arch. Dorsal XIV–XV 12–14; spines subequal from the fifth,  $\frac{1}{3}$  length of head; longest soft rays  $\frac{2}{3}$  length of head. Anal III 11–12; third spine as long as longest dorsals. Pectoral as long as head, extending beyond

Fig. 307.

*Xenotilapia sima.*

Type (Tr. Z. S. 1899).

vertical of origin of anal. Ventral extending a little beyond origin of anal. Caudal with deep crescentic notch. Caudal peduncle  $1\frac{2}{3}$  to 2 times as long as deep. Scales strongly denticulate, 37–41  $\frac{3-4}{10-11}$ ; lateral lines  $\frac{35-36}{21-28}$   $\frac{5-18}$ . Brownish above, with or without a few large round darker spots, whitish beneath; a blackish opercular spot; a shining golden spot on the suboperculum; dorsal greyish, other fins yellowish.

Total length 150 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

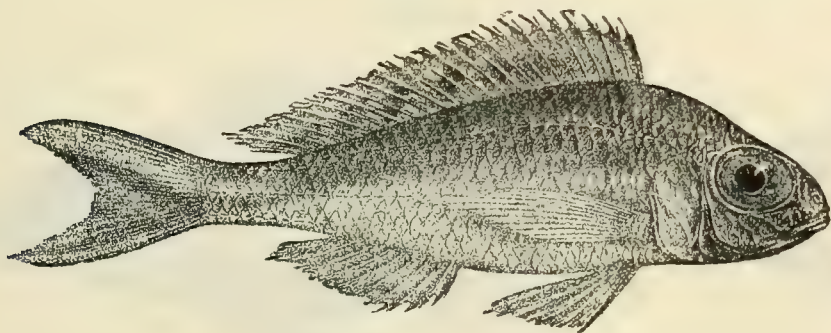
- |                      |              |                            |
|----------------------|--------------|----------------------------|
| 1. One of the types. | Moliro.      | Capt. Lemaire (C.).        |
| 2. Ad.               | Albertville. | Capt. Hecq (C.).           |
| 3. Skel.             | "            | "                          |
| 4–5. Ad.             | Niamkolo.    | Dr. W. A. Cunningham (C.). |

## 2. XENOTILAPIA ORNATIPINNIS.

Bouleng. Ann. & Mag. N. H. (7) vii. 1901, p. 3, Poiss. Bass. Congo, p. 442 (1901),  
and Tr. Zool. Soc. xvi. 1901, p. 154, pl. xviii. fig. 2 ; Pellegr. Mém. Soc.  
Zool. France, xvi. 1904, p. 370.

Depth of body nearly equal to length of head,  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times in total length. Head as in the preceding. 15 to 17 gill-rakers on lower part of anterior arch. Dorsal XIII–XV 12–13 ; spines subequal from the fifth or sixth,  $\frac{2}{3}$  length of head. Anal III 7–8 ; third spine as long as longest dorsals. Pectoral as long as or a little longer than head. Ventral not reaching anal. Caudal deeply notched, crescentic. Caudal peduncle  $1\frac{2}{3}$  times as long as deep. Scales 34–37  $\frac{3}{10}$  ; lateral lines  $\frac{28-32}{13-18}$ .  
4-12

Fig. 308.

*Xenotilapia ornatipinnis.*

Type (Tr. Z. S. 1901).

Pale brownish ; a more or less distinct silvery lateral band ; spinous dorsal black-edged ; large blackish spots or oblique bars on the dorsal ; upper lobe of caudal edged with blackish ; a chevron-shaped blackish band lower down on the caudal, disposed asymmetrically.

Total length 110 millim.

Lake Tanganyika.

1–6. Types.

Kibwesi.

Prof. J. E. S. Moore (C.).

7. Skel.

”

”

## 24. GRAMMATOTRIA.

Bouleng. Tr. Zool. Soc. xv. 1899, p. 90, and Poiss. Bass. Congo, p. 443 (1901) ;  
Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 369.

Body elongate ; scales ctenoid ; three incomplete lateral lines. Teeth conical, the outer moderately large, the inner minute and forming a

narrow band. Maxillary exposed at the end. A large papillose pad on each side of the pharynx, forming a strong protuberance in front of the upper part of the branchial arches. Dorsal with 15 spines, anal with 3 or 4. Occipital and parietal crests strong, extending to between the orbits. Vertebrae 36 (14+22).

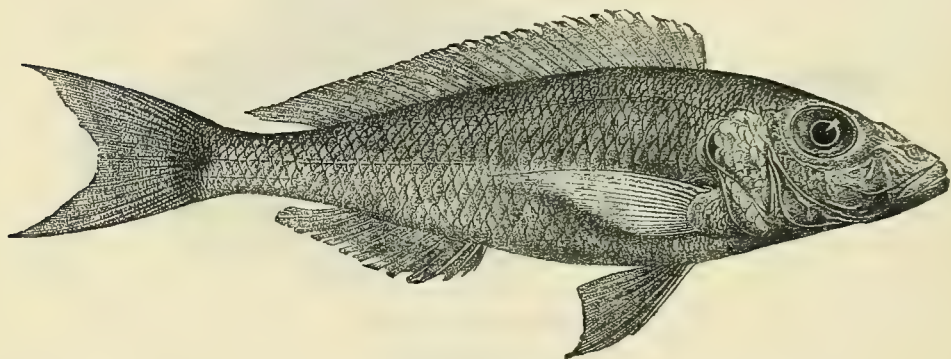
Lake Tanganyika.

#### 1. GRAMMATOTRIA LEMAIRII.

Bouleng. Tr. Zool. Soc. xv. 1899, p. 90, pl. xviii, fig. 3, Ann. Mus. Congo, Zool. i. p. 146 (1901), and Poiss. Bass. Congo, p. 443 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 369; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 569.

Depth of body 4 to  $4\frac{1}{2}$  times in total length, length of head 3 to  $3\frac{1}{2}$  times. Head  $2\frac{1}{3}$  to  $2\frac{1}{2}$  times as long as broad; snout with slightly

Fig. 309.



*Grammatotria lemailii.*

Type (Tr. Z. S. 1899).  $\frac{5}{7}$ .

convex upper profile, longer than broad, longer than postocular part of head; eye 3 to  $3\frac{2}{3}$  times in length of head, equal to or a little exceeding interorbital width; mouth extending to between nostril and eye; teeth in 4 or 5 series; 3 or 4 series of scales on the cheek. Gill-rakers rather short, 10 to 12 on lower part of anterior arch. Dorsal XV 14-15; spines rather feeble, equal from the fifth or seventh,  $\frac{2}{7}$  or  $\frac{1}{3}$  length of head; soft rays not or but little longer. Anal III-IV 10-11; last spine a little stronger, but shorter, than dorsal. Pectoral  $\frac{3}{4}$  to  $\frac{5}{6}$  length of head, extending to, or nearly to, vertical of origin of anal. Ventral reaching vent, or not quite so far. Caudal with deep crescentic notch. Caudal peduncle 2 to  $2\frac{1}{2}$  times as long as deep. Scales finely denticulate, 52-55  $\frac{4-5}{12-14}$ ; lateral lines  $\frac{41-52}{24-28}$ ,  $\frac{5}{2-15}$ . Grey or pale brown above,



uniform or with irregular darker blotches; a brown opercular spot; a brown spot sometimes present at the root of the caudal; dorsal greyish with round light spots and finely edged with black; anal and ventrals yellowish.

Total length 210 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

1. Ad.	Niamkolo.	Dr. W. A. Cunningham (C.).
2. Skel.	"	"
3. Ad.	Kasawa.	"
4. Ad.	Kilewa Bay.	Dr. L. Stappers (C.).
5. Ad.	Moliro.	"
6. Ad.	Kapampa.	"

## 25. TREMATOCARA.

Bouleng. Tr. Zool. Soc. xv. 1899, p. 89, and Poiss. Bass. Congo, p. 444 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 365.

Body moderately elongate; scales cycloid; a single lateral line, the upper, reduced to a few tubules. Teeth very minute, conical, in a narrow band; maxillary entirely concealed under the præorbital when the mouth is closed. Nasal, frontal, præ- and suborbital, præopercular, and mandibular bones with very large and deep cavities separated by narrow septa and covered with a thin skin. Dorsal with 9 to 12 spines, anal with 3. Vertebrae 31 (12+19).

Lake Tanganyika.

### *Synopsis of the Species.*

- D. IX-X 11; A. III 10; Sc. 28-30  $\frac{3}{8}$ ; 10-16 gill-rakers on lower part of anterior arch; caudal peduncle  $1\frac{1}{2}$  times as long as deep. . . . . [p. 455.  
1. *T. marginatum*, Blgr.,
- D. X 11-12; A. III 10; Sc. 29-30  $\frac{3}{8}$ ; 20-21 gill-rakers; caudal peduncle  $1\frac{1}{2}$  times as long as deep . . . . . [p. 456.  
2. *T. nigrifrons*, Blgr.,
- D. X-XII 9-11; A. III 7-8; Sc. 30-32  $\frac{3}{7}$ ; 17-18 gill-rakers; caudal peduncle nearly twice as long as deep . . . . . [p. 457.  
3. *T. unimaculatum*, Blgr.,

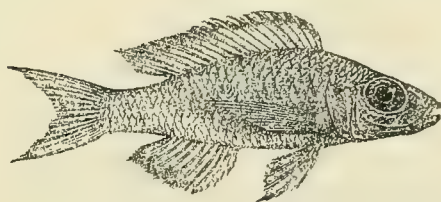
## 1. TREMATOCARA MARGINATUM.

Bouleng. Tr. Zool. Soc. xv. 1899, p. 89, pl. xix. fig. 1, Ann. Mus. Congo, Zool. i. p. 142, pl. liv. fig. 1 (1900), and Poiss. Bass. Congo, p. 444 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 366; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 570.



Depth of body 3 to  $3\frac{1}{2}$  times in total length, length of head  $2\frac{2}{3}$  to 3 times. Head twice as long as broad; snout as long as broad, with curved upper profile, shorter than eye, which is  $2\frac{1}{2}$  times in length of head and exceeds interorbital width; mouth extending to below anterior border of eye; cheek naked. Gill-rakers short, 10 to 16 on lower part of anterior arch. Dorsal IX-X 11; spines  $\frac{2}{5}$  length of head, a little shorter than longest soft rays. Anal III 10; third spine nearly as long as dorsals. Pectoral as long as head. Ventral reaching origin of anal. Caudal with deep crescentic notch. Caudal peduncle  $1\frac{1}{2}$  times as long

Fig. 310.

*Trematocara marginatum.*

Type (Tr. Z. S. 1899).

as deep. Scales  $28-30\frac{3}{8}$ ; lateral line reduced to a few (6 or 7) short tubes behind the head. Pale brownish above, white beneath; a bluish lateral stripe; fins yellowish, dorsal and anal edged with blackish.

Total length 63 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

1. Type.	Moliro.	Capt. Lemaire (C.).
2. Ad.	Albertville.	Capt. Hecq (C.).
3. Ad.	Usambura Market.	Prof. J. E. S. Moore (C.).
4. Ad.	Kilewa Bay.	Dr. L. Stappers (C.).

## 2. TREMATOCARA NIGRIFRONS.

Bouleng. Tr. Zool. Soc. xvii. 1906, p. 570, pl. xli. fig. 1.

Depth of body  $3\frac{1}{2}$  times in total length, length of head 3 times. Head twice as long as broad; snout as long as broad, with curved upper profile, a little shorter than eye, which is  $2\frac{3}{4}$  times in length of head and a little exceeds interorbital width; mouth extending to below anterior fourth of eye; cheek naked. Gill-rakers long and slender, closely set, 20 or 21 on lower part of anterior arch. Dorsal X 11-12; spines increasing in length to the last, which measures  $\frac{2}{5}$  length of head; longest soft rays  $\frac{1}{2}$  length of head. Anal III 10; third spine as long as

last dorsal. Pectoral a little longer than head. Ventral not reaching origin of anal. Caudal with deep crescentic notch. Caudal peduncle  $1\frac{1}{2}$  times as long as deep. Scales  $29-30\frac{3}{8}$ ; lateral line 7-8. Yellow; a blackish bar across the interorbital region; dorsal and anal fins with a blackish streak near the edge, which is white.

Total length 75 millim.

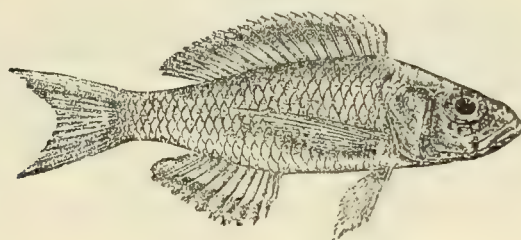
Lake Tanganyika.

1-2. Types.

Sumbu.

Dr. W. A. Cunningham (C.).

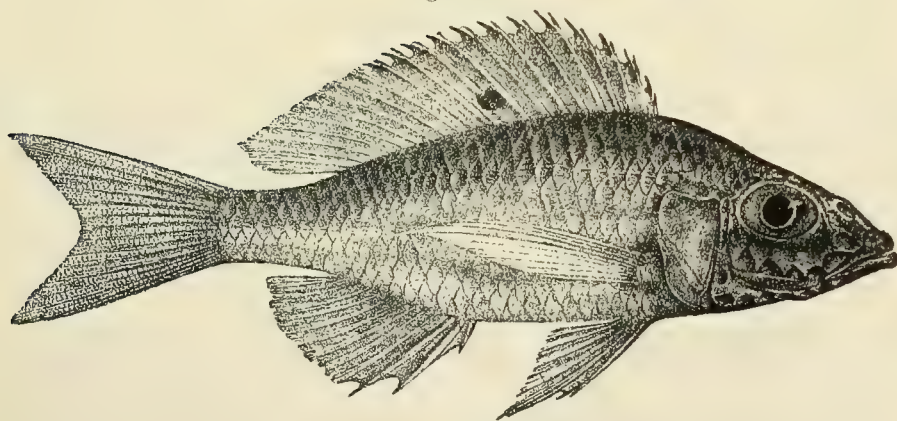
Fig. 311.



*Trematocara nigrifrons.*

Type (Tr. Z. S. 1906).

Fig. 312.



*Trematocara unimaculatum.*

Type (Tr. Z. S. 1901).

### 3. TREMATOCARA UNIMACULATUM.

Bouleng. Ann. & Mag. N. H. (7) vii. 1901, p. 3, Poiss. Bass. Congo, p. 445 (1901), and Tr. Zool. Soc. xvi. 1901, p. 155, pl. xviii. fig. 3; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 366; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 570.

Depth of body 3 to  $3\frac{1}{2}$  times in total length, length of head  $2\frac{2}{3}$  to  $2\frac{3}{4}$  times. Head  $2\frac{1}{3}$  times as long as broad; snout as long as broad, with

curved upper profile, as long as or a little shorter than eye, which is 3 to  $3\frac{1}{4}$  times in length of head and nearly double interorbital width; mouth extending to below anterior border of eye; cheek naked. Gill-rakers short, 17 or 18 on lower part of anterior arch. Dorsal X-XII 9-11; spines increasing in length to the sixth or seventh, which measures  $\frac{1}{2}$  length of head; soft rays scarcely longer. Anal III 7-8; third spine nearly as long as dorsals. Pectoral as long as or a little longer than head. Ventral reaching origin of anal. Caudal with deep crescentic notch. Caudal peduncle nearly twice as long as deep. Scales 30-32  $\frac{3}{7}$ ; lateral line 5-14. Silvery, brownish above; a large, round, black spot on posterior third of spinous part of dorsal, rarely followed by a second.

Total length 120 millim.

Lake Tanganyika.

1-9. Types.	Usambura Market.	Prof. J. E. S. Moore (C.).
10. Skel.	"	"

## 26. GEPHYROCHROMIS.

Bouleng. Ann. & Mag. N. H. (7) vii. 1901, p. 4, and Poiss. Bass. Congo, p. 448 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 298.

Body moderately elongate; scales feebly ctenoid; two incomplete lateral lines. Jaws with a band of very small tricuspid teeth, with an outer series of larger, closely set, conical, strongly incurved teeth. Maxillary exposed at the end. Dorsal with 17 spines, anal with 3.

Lake Tanganyika.

### 1. GEPHYROCHROMIS MOORII.

Bouleng. Il. cc. and Tr. Zool. Soc. xvi. 1901, p. 156, pl. xx. fig. 1; Pellegr. t. c. p. 299.

Depth of body equal to length of head, 3 times in total length. Head twice as long as deep, with curved upper profile; snout rounded, broader than long, as long as eye, which is  $3\frac{1}{3}$  times in length of head and equals interorbital width; mouth extending to between nostril and eye; teeth in 5 series, 56 in outer series of upper jaw; 3 series of scales on the cheek. Gill-rakers short, 13 on lower part of anterior arch. Dorsal XVII 8; spines increasing in length to the last, which measures  $\frac{2}{5}$  length of head and  $\frac{3}{5}$  longest soft rays. Anal III 7; third spine a little shorter than last dorsal. Pectoral nearly as long as head, not extending to vertical of origin of anal. Ventral produced into a



long filament extending beyond origin of anal. Caudal rounded. Caudal peduncle as long as deep. Scales very indistinctly denticulate,  $30 \frac{3}{11}$ ; lateral lines  $\frac{22}{13}$ . Uniform pale brown.

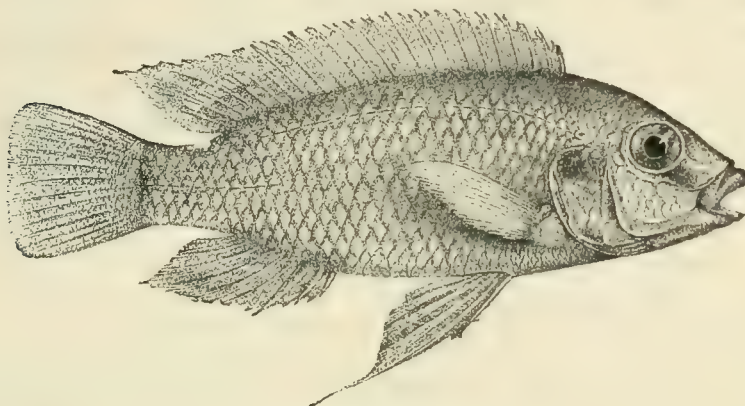
Total length 120 millim.

Lake Tanganyika.

1. Type. N. end of L. Tanganyika.

Prof. J. E. S. Moore (C.).

Fig. 313.



*Gephyrochromis moorii*.

Type (Tr. Z. S. 1901).

## 27. LAMPROLOGUS.

Schilthuis, Tijdschr. Nederl. Dierk. Ver. (2) iii. 1891, p. 85; Bouleng. Proc. Zool.

Soc. 1898, p. 134, and Poiss. Bass. Congo, p. 396 (1901); Pellegr. Mém.

Soc. Zool. France, xvi. 1904, p. 288.

*Lepidiolamprologus*, Pellegr. t. c. p. 295.

Body short or more or less elongate; scales strongly denticulate, very small on nape and anterior part of back; two incomplete lateral lines, or the lower absent. Teeth conical, forming a villiform band with more or less strongly enlarged canines in front of each jaw. End of maxillary exposed. Dorsal with 16 to 21 spines, anal with 4 to 10. Occipital and parietal crests strong, the former extending to between the orbits; præmaxillary process extending to between the orbits. Vertebrae 31–35\*.

Congo and Lake Tanganyika.

\* 31 (15+16) in *L. congolensis*.

32 (14+18) in *L. lemairii*.

35 (17+18) in *L. modestus*.

35 (16+19) in *L. furcifer*.



*Synopsis of the Species.*

I. Caudal rounded, truncate, or slightly emarginate.

A. 4 anal spines; scales 40-53; caudal rounded.

D. XVIII-XIX 11; A. IV 7; Sc. 40-43  $\frac{5-6}{12}$ ;

9 gill-rakers on lower part of anterior arch; mouth extending to below anterior border of eye . . . . .

1. *L. brevianalis*, Blgr., p. 462.

D. XX 10; A. IV 7; Sc. 41  $\frac{8}{15}$ ; 10 gill-

rakers; mouth not extending to below anterior border of eye . . . . .

2. *L. tetracanthus*, Blgr., p. 463.

D. XX 11; A. IV 7-8; Sc. 47-53  $\frac{8}{14}$ ; 6-8

gill-rakers; mouth extending to below anterior border of eye . . . . .

3. *L. marginatus*, Blgr., p. 463.

B. 5 to 7 anal spines.

1. Less than 60 scales in a longitudinal series.

a. Caudal rounded or subacuminate.

α. Two lateral lines.

D. XVIII-XIX 8-10; A. VI-VII 5-6;

Sc. 42-53  $\frac{6-7}{14-15}$ ; 9-10 gill-rakers on

lower part of anterior arch . . . . .

4. *L. congolensis*, Schilth., p. 464.

D. XVII-XVIII 8-9; A. V-VI 5-6;

Sc. 30-36  $\frac{4-7}{14-15}$ ; 8-9 gill-rakers . . . . .

5. *L. tumbanus*, Blgr., p. 465.

D. XIX 8; A. V-VI 6-7; Sc. 33-34  $\frac{6}{15}$ ;

5 gill-rakers; depth of body more than 4 times in total length . . . . .

6. *L. mocquardii*, Pellegr., p. 466.

D. XVI-XVII 10-11; A. V 6; Sc. 37-42

$\frac{5-7}{13-15}$ ; 9 gill-rakers . . . . .

7. *L. tretocephalus*, Blgr., p. 466.

D. XVIII-XIX 8-9; A. VI-VII 7-8;

Sc. 52-57  $\frac{5-7}{15-17}$ ; 12-16 gill-rakers . . . . .

8. *L. hecqui*, Blgr., p. 467.

β. Upper lateral line short, lower absent.

D. XVII-XVIII 8-9; A. VI-VII 6;

Sc. 35-38  $\frac{3-4}{10-11}$ ; 8 gill-rakers . . . . .

9. *L. multifasciatus*, Blgr., p. 468.

b. Caudal truncate or slightly emarginate.

D. XIX-XX 8-10; A. V-VI 6-7; Sc. 36-40

$\frac{4-6}{13-14}$ ; 7 gill-rakers; snout a little longer than eye . . . . .

10. *L. modestus*, Blgr., p. 469.

D. XIX 9; A. V 7; Sc. 42-46  $\frac{7-8}{13-14}$ ; 7-8 gill-

rakers; snout much longer than eye . . . . .

11. *L. mondabu*, Blgr., p. 470.

D. XVII 9; A. VI 8; Sc. 38-40  $\frac{5}{9}$ ; snout

longer than eye . . . . .

12. *L. steindachneri*, Blgr., p. 471.

2. 60 or more scales in a longitudinal series.

a. Caudal truncate.

D. XVIII-XIX 9-11; A. VI 4-7; Sc. 60-62

$\frac{12-13}{15-16}$ ; snout as long as or a little longer

than eye . . . . . 13. *L. boulengeri*, Sldr., p. 471.

D. XVII-XVIII 10-11; A. V-VI 7-9;

Sc. 85-95  $\frac{10-11}{25-28}$ ; 9-12 gill-rakers; snout

$1\frac{2}{3}$  (young) to 3 times diameter of eye . 14. *L. elongatus*, Blgr., p. 472.

D. XVIII-XIX 10; A. V-VI 8-9; Sc. 85-90

$\frac{9-10}{20-21}$ ; 15-16 gill-rakers; snout  $1\frac{1}{3}$  to  $1\frac{1}{2}$

times diameter of eye . . . . . 15. *L. pleurostigma*, Blgr., p. 473.

b. Caudal rounded.

D. XX-XXI 10-11; A. V 7-8; Sc. 83-87

$\frac{8-10}{20-21}$ ; 7-8 gill-rakers . . . . . 16. *L. cunningtoni*, Blgr., p. 474.

C. 7 to 10 anal spines; less than 50 scales in longitudinal series.

1. Caudal rounded.

a. Depth of body 3 to 4 times in total length; 9-12 gill-rakers on lower part of anterior arch.

D. XVIII-XIX 7-8; A. VIII 5-6; Sc. 40-48

$\frac{8-11}{16-18}$  . . . . . 17. *L. lemairii*, Blgr., p. 475.

D. XVIII-XIX 9-10; A. VII-VIII 7-8;

Sc. 38-44  $\frac{4-5}{10-11}$  . . . . . 18. *L. callipterus*, Blgr., p. 476

D. XIX 8; A. X 6; Sc. 46  $\frac{5}{10}$  . . . . . 19. *L. fasciatus*, Blgr., p. 477.

b. Depth of body  $2\frac{1}{2}$  to 3 times in total length; 9-15 gill-rakers.

D. XVI-XVIII 6-7; A. VII-IX 5-6;

Sc. 30-35  $\frac{3}{13}$ ; 9 gill-rakers . . . . . 20. *L. brevis*, Blgr., p. 478.

D. XIX-XX 8-9; A. VII-VIII 6-7;

Sc. 33-35  $\frac{5-7}{11-12}$ ; 9-10 gill-rakers . . . 21. *L. moorii*, Blgr., p. 478.

D. XX-XXI 6; A. X 5; Sc. 32-33  $\frac{5}{12}$ ;

15 gill-rakers; head strongly compressed. 22. *L. compressiceps*, Blgr., p. 479.

c. Depth of body  $2\frac{2}{3}$  to  $2\frac{5}{6}$  times in total length; 23-25 gill-rakers.

D. XVIII-XIX 8; A. VII-VIII 7-8;

Sc. 35-38  $\frac{4-5}{12-13}$  . . . . . 23. *L. taniurus*, Blgr., p. 480.

2. Caudal truncate; 14-16 gill-rakers on lower part of anterior arch.

D. XVIII-XIX 8; A. VIII 6-8; Sc. 35-36

$\frac{3-4}{12-13}$ ; depth of body  $2\frac{3}{4}$  to 3 times in

total length . . . . . 24. *L. calliurus*, Blgr., p. 481.

D. XIX 10; A. VIII 8; Sc. 39  $\frac{4}{13}$ ; depth of

body 4 times in total length . . . . . 25. *L. reticulatus*, Blgr., p. 482. \*

II. Caudal deeply notched.

D. XIX-XXI 7-9; A. VI-VII 5-6;

Sc. 50-60  $\frac{6-8}{16-20}$ ; 14-16 gill-rakers on

lower part of anterior arch . . . . . 26. *L. furcifer*, Bgr., p. 483.

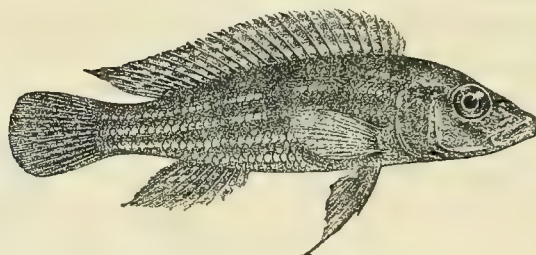
*Julidochromis ocellatus*, Steind. Anz. Ak. Wien, 1909, p. 402, from L. Tanganyika, probably belongs to this genus, but I am unable to suggest its proper place in the system without an examination of the type-specimen, preserved in the Vienna Museum.

### 1. LAMPROLOGUS BREVIANALIS.

Bouleng. Tr. Zool. Soc. xvii. 1906, p. 555, pl. xxxvi. fig. 1.

Depth of body  $3\frac{2}{3}$  times in total length, length of head 3 times. Head  $2\frac{1}{3}$  times as long as broad, with nearly straight upper profile; snout pointed, a little longer than eye, which is  $3\frac{1}{2}$  times in length of

Fig. 314.



*Lamprologus brevianalis*.  
Type (Tr. Z. S. 1906).  $\frac{5}{6}$ .

head and equals interorbital width; mouth extending to below anterior border of eye; 8 rather large canine teeth in front of upper jaw and 4 in lower, followed by a moderately broad band of minute teeth; lateral teeth small; cheek naked; pits of sensory canals very large. Gill-rakers short, 9 on lower part of anterior arch. Dorsal XVIII-XIX 11; spines subequal from the eighth,  $\frac{2}{5}$  length of head; longest soft rays  $\frac{3}{5}$  length of head. Anal IV 7; fourth spine as long as longest dorsals. Pectoral  $\frac{2}{3}$  length of head. Ventral reaching origin of anal. Caudal rounded. Caudal peduncle slightly longer than deep. Scales 40-43  $\frac{5-6}{12}$ ; lateral lines  $\frac{23-29}{9-15}$ . Brown, somewhat lighter beneath, with darker and lighter longitudinal streaks on the sides and five broad dark transverse bands; vertical fins with numerous round whitish spots.

Total length 83 millim.

Lake Tanganyika.

1. Type.

Niamkolo.

Dr. W. A. Cunningham (C.).

2. Yg.

Komba Bay.

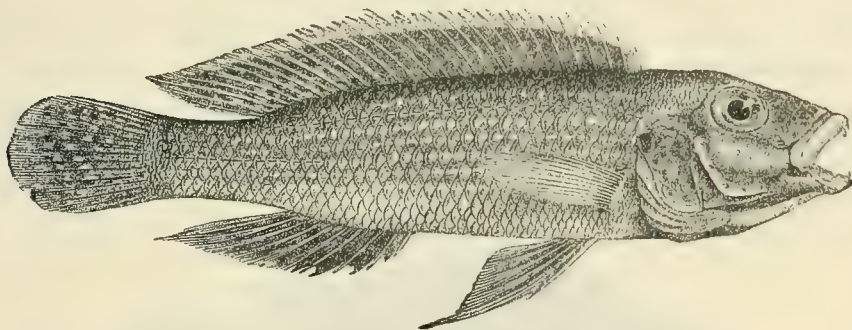
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## 2. LAMPROLOGUS TETRACANTHUS.

Bouleng. Ann. Mus. Congo, Zool. i. p. 118, pl. xlv. fig. 5 (1899), and Poiss. Bass. Congo, p. 398 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 288.

Depth of body 4 times in total length, length of head  $3\frac{1}{3}$  times. Snout with slightly convex upper profile, a little longer than eye, which is  $3\frac{2}{3}$  times in length of head and a little exceeds interorbital width; mouth extending to between nostril and eye; head naked; pits of sensory canals very large. Gill-rakers short, 10 on lower part of anterior arch. Dorsal XX 10; spines increasing in length to the last, which measures  $\frac{2}{5}$  length of head and  $\frac{3}{5}$  longest soft rays. Anal IV 7. Pectoral  $\frac{3}{5}$  length of head. Ventral produced into a filament, extending a little beyond origin of anal. Caudal rounded. Caudal peduncle a

Fig. 315.

*Lamprologus tetracanthus.*

Type (A. M. C.).

little longer than deep. Scales  $41\frac{8}{15}$ , very small on nape and belly; lateral lines  $\frac{30}{15}$ . Dark brown; a black opercular spot; fins blackish, dorsal edged with white; light spots on the caudal.

Total length 120 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

## 3. LAMPROLOGUS MARGINATUS.

Bouleng. Rev. Zool. Afr. iii. 1914, p. 443.

Depth of body  $3\frac{3}{4}$  to 4 times in total length, length of head  $3\frac{1}{3}$  times. Snout with slightly convex upper profile, a little longer than eye, which is  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times in length of head and measures  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times interorbital width; mouth extending to below anterior border of eye; sides of head naked, except a few scales on gill-cover; pits of sensory canals very large. Gill-rakers short, 6 to 8 on lower part of anterior arch. Dorsal XX 11; spines increasing in length to the last, which measures



$\frac{2}{5}$  or nearly  $\frac{1}{2}$  length of head and  $\frac{1}{2}$  to  $\frac{2}{3}$  longest soft ray. Anal IV 7-8. Pectoral  $\frac{2}{3}$  length of head. Ventral produced into a filament, reaching origin of anal. Caudal rounded. Caudal peduncle  $1\frac{1}{3}$  times as long as deep. Scales 47-53  $\frac{8}{14}$ , very small on nape and belly; lateral lines  $\frac{29-32}{30-33}$ . Brown, with five darker transverse bands; a blackish opercular spot; fins brown, dorsal edged with white and with the lappets behind the spines sometimes black; small and light spots on the soft dorsal and caudal, sometimes also on the anal.

Total length 120 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

1. One of the types.

Vua.

Dr. L. Stappers (C.).

#### 4. LAMPROLOGUS CONGOLENSIS.

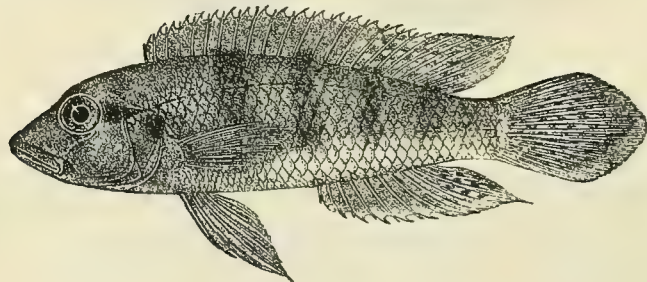
Schilth. Tijdschr. Nederl. Dierk. Ver. (2) iii. 1891, p. 85, pl. vi. fig. 1; Bouleng.

Proc. Zool. Soc. 1898, p. 134, and Poiss. Bass. Congo, p. 402 (1901);

Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 291.

Depth of body  $3\frac{1}{2}$  to 4 times in total length, length of head 3 to  $3\frac{1}{4}$  times. Head 2 to  $2\frac{1}{4}$  times as long as broad; snout a little longer than

Fig. 316.



*Lamprologus congolensis.*

Type.

eye, which is  $3\frac{1}{2}$  to 4 times in length of head and equals or a little exceeds interorbital width; mouth extending to below anterior border of eye; 6 to 10 canines in front of each jaw, followed by a band of minute teeth; lateral teeth small; cheek naked. Gill-rakers short, 9 or 10 on lower part of anterior arch. Dorsal XVIII-XIX 8-10; spines increasing in length to the last, which measures  $\frac{2}{5}$  length of head and about  $\frac{1}{2}$  longest soft rays. Anal VI-VII 5-6; last spine as long as last dorsal. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Ventral reaching vent or origin of anal. Caudal rounded, subacuminate. Caudal peduncle as

long as deep. Scales 42-53  $\frac{6-8}{14-15}$ ; lateral lines  $\frac{23-26}{8-13}$ . Brownish or olive, with 5 or 6 more or less distinct darker cross-bands; a dark brown streak on the temple and a blackish opercular spot; vertical fins brown, spotted with white, or caudal with round dark brown spots forming irregular bars.

Total length 100 millim.

Congo.

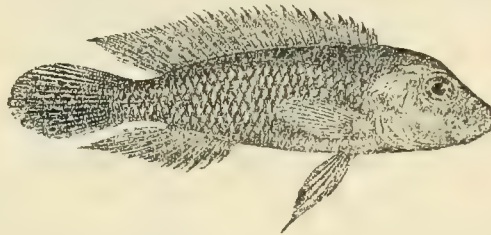
1. Ad.	Matadi, Lower Congo.	Capt. Wilverth (C.).
2-4. Types.	Kinshassa, Stanley Pool.	M. A. Greshoff (C.); Utrecht University (E.).
5-7. Ad. & hgr.	Monsembe, Upper Congo.	Rev. J. H. Weeks (P.).
8. Skel.	" "	" "
9-10. Ad. & hgr.	Stanley Falls.	Dr. C. Christy (C.).

##### 5. LAMPROLOGUS TUMBANUS.

Bouleng. Ann. Mus. Congo, Zool. i. p. 116, pl. xlv. fig. 3 (1899), and Poiss. Bass. Congo, p. 401 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 290.

Depth of body  $3\frac{1}{2}$  to  $3\frac{3}{4}$  times in total length, length of head 3 to  $3\frac{1}{4}$  times. Head  $2\frac{1}{4}$  times as long as broad; snout as long as eye, which is

Fig. 317.



*Lamprologus tumbanus.*

Type (A. M. C.).

$3\frac{1}{3}$  to  $3\frac{3}{4}$  times in length of head and equals or a little exceeds inter-orbital width; mouth extending to below anterior border of eye; 8 canines in front of each jaw, followed by a band of minute teeth; lateral teeth small; cheek naked. Gill-rakers short, 8 or 9 on lower part of anterior arch. Dorsal XVII-XVIII 8-9; spines increasing in length to the last, which measures  $\frac{2}{5}$  length of head and  $\frac{1}{2}$  longest soft rays. Anal V-VI 5-6. Pectoral  $\frac{2}{3}$  length of head. Ventral reaching vent, or not quite so far. Caudal rounded, subacuminate. Caudal peduncle as long as deep. Scales 30-36  $\frac{4-7}{14-15}$ ; lateral lines  $\frac{18-20}{10-12}$ .

Purplish brown, the scales edged with blackish; traces of 5 darker cross-bars on the back; a blackish opercular spot; fins dark grey or blackish.

Total length 72 millim.

Upper Congo.—Types in Congo Museum, Tervueren.

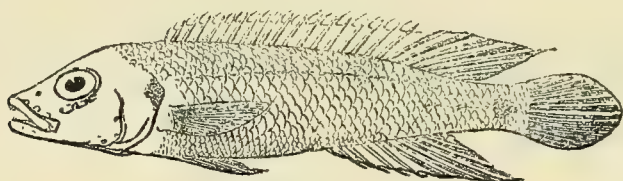
- |                      |                   |                      |
|----------------------|-------------------|----------------------|
| 1. One of the types. | Bikoro, L. Tumba. | M. P. Delhez (C.).   |
| 2. Hgr.              | Stanley Falls.    | Dr. C. Christy (C.). |

#### 6. LAMPROLOGUS MOCQUARDII.

Pellegr. Bull. Mus. Paris, 1903, p. 221, and Mém. Soc. Zool. France, xvi. 1904, p. 291, fig.

Depth of body  $4\frac{1}{4}$  to  $4\frac{1}{3}$  times in total length, length of head  $3\frac{1}{3}$  times. Upper profile of head straight; snout as long as eye,  $3\frac{1}{2}$  times in length of head; mouth extending to below anterior border of eye; head naked.

Fig. 318.



*Lamprologus mocquardii.*

Type, after Pellegrin (Mém. Soc. Zool. France, 1904).

Gill-rakers short, 5 on lower part of anterior arch. Dorsal XIX 8; spines increasing in length to the last, which measures  $\frac{2}{3}$  length of head. Anal V–VI 6–7. Pectoral  $\frac{2}{3}$  length of head. Ventral not reaching vent. Caudal rounded, subacuminate. Caudal peduncle a little longer than deep. Scales 33–34  $\frac{6}{15}$ , very small on nape and belly; lateral lines  $\frac{22-24}{7-10}$ . Yellowish, with traces of five dark cross-bars; fins uniform greyish.

Total length 63 millim.

Upper Ubanghi.—Types in Paris Museum.

#### 7. LAMPROLOGUS TRETOCEPHALUS.

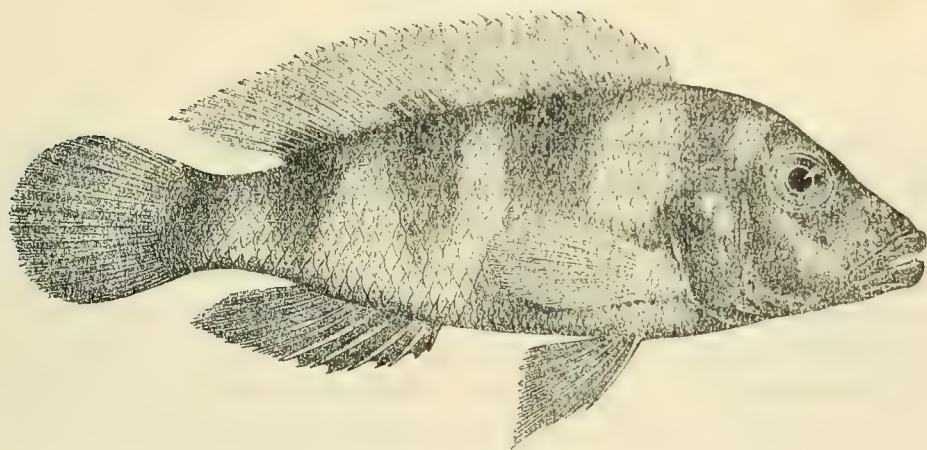
Bouleng. Ann. Mus. Congo, Zool. i. p. 117, pl. xlv. fig. 4 (1899), and Poiss. Bass. Congo, p. 399 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 289; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 557.

Depth of body equal to length of head, 3 times in total length. Head twice as long as broad, with slightly concave upper profile;



snout as long as or a little longer than eye, which is  $3\frac{1}{2}$  times in length of head and equals interorbital width; mouth extending to between nostril and eye; canine teeth small; head naked; pits of sensory canals very large. Gill-rakers very short, 9 on lower part of anterior arch. Dorsal XVI-XVII 10-11; spines increasing in length to the last, which measures nearly  $\frac{1}{2}$  length of head and a little less than longest soft rays. Anal V 6. Pectoral  $\frac{2}{3}$  length of head. Ventral reaching anal or a little beyond. Caudal rounded. Caudal peduncle scarcely longer than deep. Scales 37-42  $\frac{5-7}{13-15}$ , very small on nape and belly; lateral lines  $\frac{29-34}{10-16}$ . Olive, with five dark cross-bars on the back, the first on the nape and descending to the gill-cover, the three

Fig. 319.

*Lamprologus tretocephalus.*

Type (A. M. C.).

following produced on the base of the dorsal fin, the last on the caudal peduncle.

Total length 140 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

1. Hgr.

Kigoma.

Dr. W. A. Cunningham (C.).

## 8. LAMPROLOGUS HECQUI.

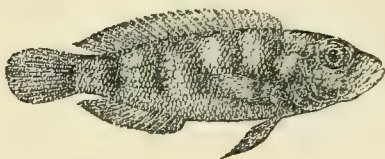
Bouleng. Ann. Mus. Congo, Zool. i. p. 115, pl. xlv. fig. 1 (1899), and Poiss. Bass. Congo, p. 403 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 293; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 559,

Depth of body  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times in total length, length of head 3 times. Head twice as long as broad. Snout not longer than diameter of eye,



which is  $2\frac{3}{4}$  to 3 times in length of head and  $\frac{2}{3}$  to once in interorbital width; mouth extending to below anterior border of eye; 6 or 8 moderately large canine teeth in front of each jaw, followed by a band of minute teeth; lateral teeth very small; cheek naked or with small deciduous scales. Gill-rakers rather long and slender, 12 to 16 on lower part of anterior arch. Dorsal XVIII–XIX 8–9; spines increasing in length to the last, which measures  $\frac{2}{5}$  or a little less than  $\frac{1}{2}$  length of

Fig. 320.

*Lamprologus hecqui.*

Type (A. M. C.).

head; longest soft rays about  $\frac{1}{2}$  length of head. Anal VI–VII 7–8; last spine as long as or a little shorter than last dorsal. Pectoral  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Ventral reaching vent. Caudal rounded. Caudal peduncle as long as deep. Scales 52–57  $\frac{5-7}{15-17}$ ; lateral lines  $\frac{25-36}{4-10}$ . Grey above, lighter beneath, with 5 to 9 dark vertical bars on each side, or large blotches alternating with narrow bars; a more or less distinct dark round spot at the root of the caudal fin; vertical fins with dark bars; dorsal fin and upper part of caudal with a pale border, faintly edged with black.

Total length 60 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

1–2. Ad.	Mtondwe Bay.	Dr. W. A. Cunningham (C.).
3–4. Ad.	Niamkolo Bay.	„
5–6. Ad.	Kalembwe.	Dr. L. Stappers (C.).

#### 9. LAMPROLOGUS MULTIFASCIATUS.

Bouleng. Tr. Zool. Soc. xvii. 1906, p. 558, pl. xxxv. fig. 3.

Depth of body  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times in total length, length of head  $2\frac{3}{4}$  to 3 times. Head twice as long as broad; snout as long as eye, which is  $3\frac{1}{3}$  times in length of head and equals interorbital width; mouth extending to below anterior border of eye; 8 canine teeth in front of each jaw, followed by a narrow band of minute teeth; lateral teeth

small; cheek naked. Gill-rakers moderately long, 8 on lower part of anterior arch. Dorsal XVII–XVIII 8–9; spines subequal from the eighth or ninth, about  $\frac{2}{3}$  length of head; longest soft ray  $\frac{1}{2}$  length of head. Anal VI–VII 6; last spine slightly longer than longest dorsal. Pectoral  $\frac{3}{5}$  length of head. Ventral nearly reaching origin of anal. Caudal rounded. Caudal peduncle as long as deep. Scales 35–38  $\frac{3-4}{10-11}$ ; upper lateral line short, 8–15, lower absent. Pale brown above,

Fig. 321.

*Lamprologus multifasciatus.*

Type (Tr. Z. S. 1906).

white beneath, with 16 or 17 very regular dark brown bars, the last 3 or 4 of which are on the caudal fin; dorsal fin with oblique dark brown bars.

Total length 34 millim.

Lake Tanganyika.

1–4. Types.	Niamkolo Bay.	Dr. W. A. Cunningham (C.).
5–6. Ad. & hgr.	Sumbu Bay.	Dr. L. Stappers (C.).
7. Ad.	Luvu Bay.	„

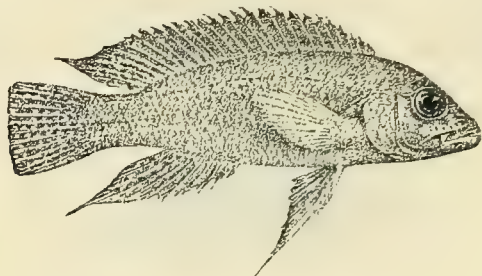
#### 10. LAMPROLOGUS MODESTUS.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 8, pl. i. fig. 5, and Poiss. Bass. Congo, p. 400 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 289; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 558.

Depth of body  $3\frac{1}{3}$  to  $3\frac{2}{3}$  times in total length, length of head 3 to  $3\frac{1}{3}$  times. Head twice as long as broad; snout a little longer than eye, which is  $3\frac{1}{2}$  to 4 times in length of head and equals interorbital width; mouth extending to below anterior border of eye; 6 rather large canine teeth in front of each jaw, followed by a moderately broad band of minute teeth; lateral teeth small; cheek naked. Gill-rakers very short, 7 on lower part of anterior arch. Dorsal XIX–XX 8–10; spines increasing in length to the last, which measures a little less than  $\frac{1}{2}$  length of head; median soft rays produced,  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Anal V–VI 6–7; last spine a little shorter than last dorsal. Pectoral

about  $\frac{2}{3}$  length of head. Ventral produced into a filament, extending beyond origin of anal. Caudal truncate. Caudal peduncle as long as deep. Scales 36-40  $\frac{4-6}{13-14}$ ; lateral lines  $\frac{19-25}{5-11}$ . Uniform brown, or

Fig. 322.



*Lamprologus modestus.*  
Type (Tr. Z. S. 1898).  $\frac{5}{6}$ .

yellowish with 7 brown bars across the back; soft dorsal and caudal with round blackish spots.

Total length 85 millim.

Lake Tanganyika.

1. Type.	Mbity Rocks.	Prof. J. E. S. Moore (C.).
2. Type.	Kinyamkolo.	"
3. Hgr.	Komba Bay.	Dr. W. A. Cunningham (C.).
4. Skel.	Albertville.	Capt. Hecq (C.).

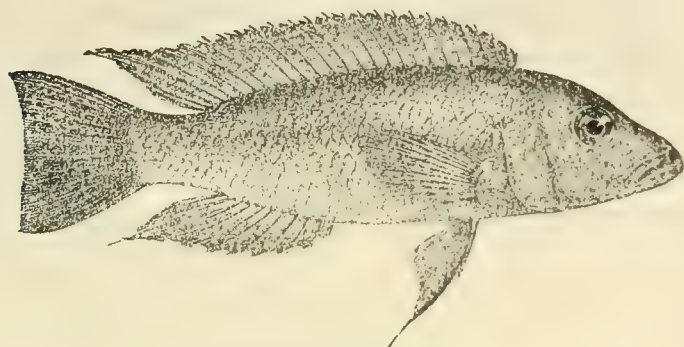
#### 11. LAMPROLOGUS MONDABU.

Bouleng. Tr. Zool. Soc. xvii. 1906, p. 557, pl. xxxvi. fig. 3.

Depth of body  $3\frac{2}{3}$  times in total length, length of head 3 times. Head  $2\frac{1}{4}$  to  $2\frac{1}{3}$  times as long as broad, with slightly concave upper profile; snout pointed,  $1\frac{2}{3}$  to 2 times as long as eye, which is  $4\frac{1}{2}$  to 5 times in length of head and equal to or slightly less than interorbital width; mouth extending to between nostril and eye; 6 large canines in front of each jaw, followed by a rather broad band of minute villiform teeth; lateral teeth small; cheek naked. Gill-rakers very short, 7 or 8 on lower part of anterior arch. Dorsal XIX 9; spines increasing in length to the last, which measures  $\frac{2}{5}$  length of head; soft dorsal acutely pointed behind, longest ray measuring  $\frac{3}{4}$  length of head. Anal V 7, last spine  $\frac{1}{3}$  length of head. Pectoral  $\frac{2}{3}$  length of head. Ventral reaching origin of anal. Caudal slightly emarginate. Caudal peduncle

as long as deep. Scales 42-46  $\frac{7-8}{13-14}$ ; lateral lines  $\frac{25-27}{9-14}$ . Uniform grey to olive, rather lighter below; dorsal edged with yellow, with yellow

Fig. 323.

*Lamprologus mondabu.*

Type (Tr. Z. S. 1906).  $\frac{5}{8}$ .

spots; upper half of caudal minutely spotted with yellow, lower half darker.

Total length 105 millim.

Lake Tanganyika.

1-2. Types.

Kaboge.

Dr. W. A. Cunningham (C.).

## 12. LAMPROLOGUS ?STEINDACHNERI.

*Julidochromis elongatus*, Steind. Anz. Ak. Wien, 1909, p. 403.

Depth of body nearly 4 times in total length, length of head nearly 3 times. Snout longer than eye, which is nearly 4 times in length of head and exceeds interorbital width; cheek naked. Dorsal XVII 9. Anal VI 8. Pectoral  $\frac{4}{5}$  length of head. Caudal truncate. Scales 38-40  $\frac{5}{9}$ ; lateral lines  $\frac{24}{9-10}$ . Brownish yellow, dorsal scales edged with dark brown; a dark band from the eye to the angle of the mouth; a very small dark opercular spot.

Total length 60 millim.

Lake Tanganyika.—Type in Vienna Museum.

## 13. LAMPROLOGUS ?BOULENGERI.

*Julidochromis boulengeri*, Steind. Anz. Ak. Wien, 1909, p. 400.

Depth of body  $3\frac{2}{3}$  to  $3\frac{1}{2}$  times in total length, length of head 3 to  $3\frac{1}{4}$  times. Snout as long as or a little longer than eye, which is 3 times

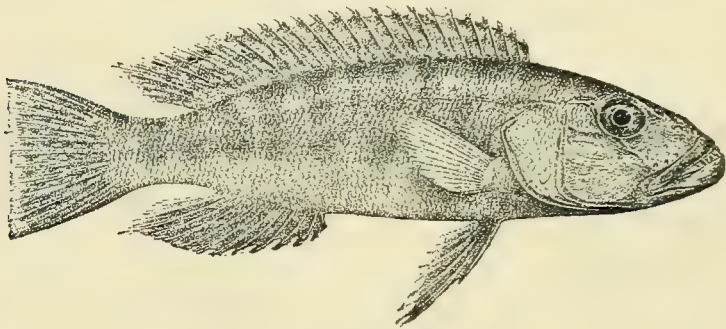


in length of head and double interorbital width; mouth extending to below anterior third of eye; 4 to 6 large canines in front of each jaw; cheek naked. Dorsal XVIII-XIX 9-11. Anal VI 4-7. Pectoral about  $\frac{2}{3}$  length of head. Caudal truncate, slightly emarginate. Caudal peduncle longer than deep. Scales 60-62  $\frac{12-13}{15-16}$ ; lateral lines  $\frac{26-34}{10-13}$ . Brownish yellow; a series of square brown spots, alternately larger and smaller, along the base of the dorsal and a second series, 8 in number, along each side.

Total length 62 millim.

Lake Tanganyika.—Types in Vienna Museum.

Fig. 321.



*Lamprologus elongatus.*

Type (Tr. Z. S. 1898).  $\frac{5}{6}$ .

#### 14. LAMPROLOGUS ELONGATUS.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 9, pl. i. fig. 6, Poiss. Bass. Congo, p. 398 (1901), and Tr. Zool. Soc. xvii. 1906, p. 556.

*Lepidiolamprologus elongatus*, Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 295.

Depth of body  $3\frac{2}{3}$  to  $4\frac{1}{2}$  times in total length, length of head  $2\frac{3}{4}$  to 3 times. Head  $2\frac{1}{4}$  to  $2\frac{1}{2}$  times as long as broad, with slightly convex upper profile; snout  $1\frac{2}{3}$  (young) to 3 times diameter of eye, which is  $4\frac{1}{2}$  to 8 times in length of head and 1 to  $1\frac{1}{2}$  times in interorbital width; chin slightly projecting; mouth extending to below anterior border of eye; 6 to 8 large canines, wide apart, in front of each jaw, followed by a band of minute teeth, this band narrow in the young and broad in the adult; lateral teeth small; cheek naked in the young, covered with very small scales in the adult. Gill-rakers rather short, 9 to 12 on lower part of anterior arch. Dorsal XVII-XVIII 10-11; spines increasing in length to the last, which measures  $\frac{1}{3}$  length of head;

longest soft rays  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Anal V-VI 7-9; last spine as long as or a little shorter than last dorsal. Pectoral  $\frac{1}{2}$  length of head. Ventral reaching vent or anal. Caudal truncate. Caudal peduncle  $1\frac{1}{2}$  times as long as deep. Scales 85-95  $\frac{10-11}{25-28}$ ; lateral lines  $\frac{36-56}{15-30}$ . Brown to blackish brown, with lighter mottling; young with dark spots with a tendency to form cross-bars; vertical fins dark brown, with small darker or lighter spots.

Total length 325 millim.

Lake Tanganyika.

1. Type.	Mbity Rocks.	Prof. J. E. S. Moore (C.).
2. Type.	Kinyamkolo.	"
3. Ad.	Niamkolo, off Mtondwe Id.	Dr. W. A. Cunningham (C.).
4. Yg.	Niamkolo Bay.	"
5. Hgr.	Sumbu.	"

#### 15. LAMPROLOGUS PLEUROSTIGMA.

Bouleng. Rev. Zool. Afr. iii. 1914, p. 443.

Depth of body 5 times in total length, length of head  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times. Head  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times as long as broad; snout with convex upper profile,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  diameters of eye, which is  $3\frac{2}{3}$  to 4 times in length of head and equals interorbital width; chin projecting; mouth extending to below anterior border of eye; 4 or 6 very large canines, wide apart, in front of each jaw, followed by a moderately broad band of minute teeth; lateral teeth small; small scales on the cheek. Gill-rakers rather long, 15-16 on lower part of anterior arch. Dorsal XVIII-XIX 10; spines increasing in length to the last, which measures  $\frac{2}{5}$  to nearly  $\frac{1}{2}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Anal V-VI 8-9; last spine  $\frac{1}{3}$  length of head. Pectoral  $\frac{2}{3}$  length of head. Ventral reaching vent. Caudal truncate. Caudal peduncle twice as long as deep. Scales 85-90  $\frac{9-10}{20-21}$ ; lateral lines  $\frac{60-62}{33-35}$ . Brown above, lighter beneath, with darker variegations and an elongate horizontal blackish spot on the side in front of the lower lateral line; a small black opercular spot; vertical fins brownish, soft dorsal and anal with small darker spots; pectorals yellow; ventrals blackish.

Total length 150 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

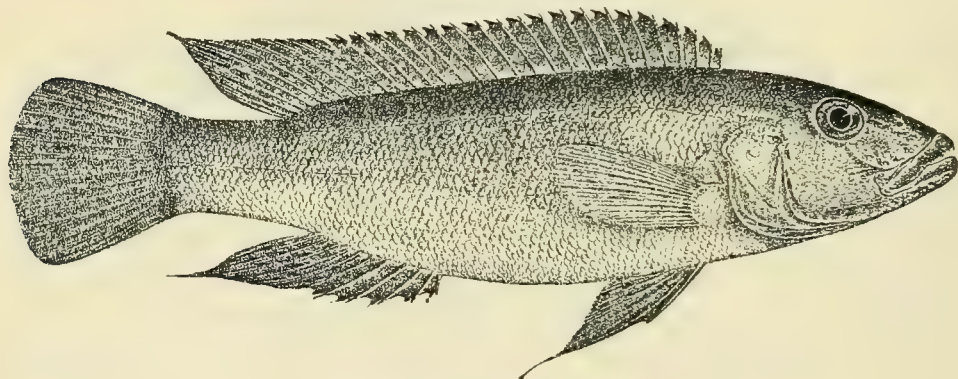
1. One of the types.	Kilewa Bay.	Dr. L. Stappers (C.).
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## 16. LAMPROLOGUS CUNNINGTONI.

Bouleng. Tr. Zool. Soc. xvii. 1906, p. 557, pl. xxxvi. fig. 2.

Depth of body  $3\frac{3}{4}$  to  $4\frac{1}{4}$  times in total length, length of head  $3\frac{1}{3}$  times. Head twice as long as broad, with straight or slightly convex upper profile; snout obtusely pointed,  $1\frac{1}{3}$  to 2 times as long as eye, which is contained 4 to 5 times in length of head and 1 to  $1\frac{1}{4}$  times in interorbital width; mouth not extending quite to below anterior border of eye; 6 large canines in front of upper jaw, 4 in front of lower, followed by a rather broad band of minute villiform teeth; lateral teeth small; cheek naked. Gill-rakers short, 7 or 8 on lower part of anterior arch. Dorsal XX-XXI 10-11; spines increasing in length to the last, which measures about  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; soft dorsal acutely pointed behind, longest ray  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Anal V 7-8; last spine as long

Fig. 325.



*Lamprologus cunningtoni*.

Type (P. Z. S. 1906).  $\frac{2}{3}$ .

as last dorsal spine. Pectoral  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head. Ventral reaching vent or a little beyond. Caudal rounded. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. Scales 83-87  $\frac{8-10}{20-21}$ ; lateral lines  $\frac{50-55}{22-30}$ . Greyish brown above, white beneath; small light spots on the sides; five or six more or less distinct dark bars across the back; vertical fins brown, with rather indistinct small roundish light spots. Young with seven or eight regular dark bars on the body.

Total length 190 millim.

Lake Tanganyika.

1-2. Types.

Moliro.

Dr. W. A. Cunnington (C.).

3-4. Yg.

Mbete.

"

5. Hgr.

Songwe.

Dr. L. Stappers (C.).

6-7. Ad. & hgr.

Kilewa Bay.

"

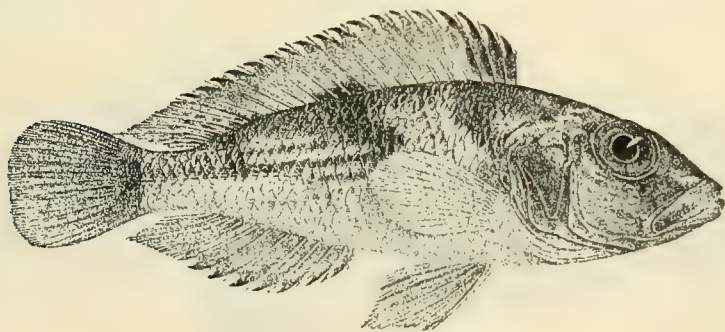


## 17. LAMPROLOGUS LEMAIRII.

Bouleng. Tr. Zool. Soc. xv. 1890, p. 88, pl. xviii. fig. 1, Ann. Mus. Congo, Zool. i. p. 140, pl. liii. fig. 1 (1900), and Poiss. Bass. Congo, p. 402 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 292; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 558.

Depth of body 3 to  $3\frac{1}{2}$  times in total length, length of head  $2\frac{3}{4}$  to 3 times. Head  $1\frac{3}{4}$  to 2 times as long as broad; snout as long as or a little longer than eye, which is 3 to 4 times in length of head and exceeds interorbital width; mouth extending to below anterior border of eye or a little beyond; 4 or 6 large curved canine teeth, wide apart, in front of each jaw, followed by a narrow band of minute teeth; lateral teeth rather large, some in the lower jaw canine-like; cheek naked. Gill-rakers short, 9 or 10 on lower part of anterior arch. Dorsal XIX 7

Fig. 326.

*Lamprologus lemailii*.

Type (A. M. C.).

(rarely XVIII 8); spines subequal from the fifth or increasing in length to the last, about  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head and  $\frac{1}{2}$  to  $\frac{3}{4}$  longest soft rays. Anal VIII 5-6; last spine as long as or a little longer than longest dorsals. Pectoral  $\frac{3}{5}$  length of head. Ventral reaching origin of anal or beyond. Caudal rounded. Caudal peduncle a little longer than deep. Scales 40-48  $\frac{8-11}{16-18}$ ; lateral lines  $\frac{25-30}{13-19}$ . Light brown to dark brown above, lighter or white beneath, uniform or most of the scales with a dark edge, and with three more or less distinct oblique dark bars on the back; a dark band from the eye to the maxillary; a black opercular spot; dorsal and anal blackish on the edge, the former usually with a large black spot between the four or five first spines of the dorsal; ventrals sometimes black.



Total length 230 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

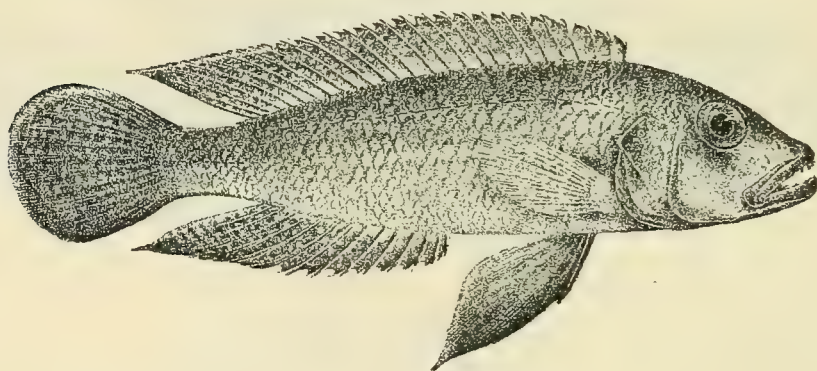
1-2. Ad.	Kibwesi.	Prof. J. E. S. Moore (C.).
3. Hgr.	Msambu.	"
4-9. Ad. & hgr.	Niamkolo.	Dr. W. A. Cunningham (C.).
10. Skel.	"	"
11. Ad.	Moliro.	Dr. L. Stappers (C.).
12-13. Ad.	Vua Bay.	"

### 18. LAMPROLOGUS CALLIPTERUS.

Bouleng. Tr. Zool. Soc. xvii. 1906, p. 559, pl. xxxvi. fig. 4.

Depth of body equal to length of head,  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times in total length. Head twice as long as broad; snout  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times as long as eye, which is 4 to  $4\frac{1}{3}$  times in length of head and nearly equals interorbital

Fig. 327.



*Lamprologus callipterus.*  
Type (Tr. Z. S. 1906).  $\frac{5}{6}$ .

width; mouth extending to below anterior border of eye; 6 or 8 large canines in front of each jaw, followed by a moderately broad band of minute teeth; lateral teeth small; cheek entirely naked or nearly so. Gill-rakers rather long, 9 to 12 on lower part of anterior arch. Dorsal XVIII-XIX 9-10; spines increasing in length to the last, which measures nearly  $\frac{1}{2}$  length of head; longest soft ray  $\frac{2}{3}$  to  $\frac{4}{5}$  length of head. Anal VII-VIII 7-8; last spine nearly as long as last dorsal. Pectoral about  $\frac{2}{3}$  length of head. Ventral more or less produced, reaching origin of anal or beyond. Caudal rounded. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. Scales 38-44  $\frac{4-5}{10-11}$ ; lateral lines

$\frac{23-25}{10-18}$ . Brown or olive above, paler or white beneath, the scales edged with darker; dorsal fin with a yellow border finely edged with blackish, this border continued on the upper third of the caudal; vertical fins with numerous small round whitish spots.

Total length 125 millim.

Lake Tanganyika.

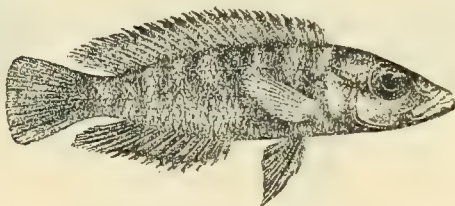
1. Type.	Mpala.	Dr. W. A. Cunningham (C.).
2-3. Types.	Niamkolo.	"
4. Ad.	Kaboge.	"

#### 19. LAMPROLOGUS FASCIATUS.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 7, pl. i. fig. 2, and Poiss. Bass. Congo, p. 406 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 293.

Depth of body 4 times in total length, length of head 3 times. Head  $2\frac{1}{3}$  times as long as broad; snout as long as eye, which is 3 times in length of head and equals  $\frac{2}{3}$  interorbital width; mouth extending

Fig. 328.



*Lamprologus fasciatus.*  
Type (Tr. Z. S. 1898).  $\frac{5}{8}$ .

to below anterior border of eye; 8 rather large canines in front of upper jaw, and 6 in front of lower, followed by a narrow band of minute teeth; lateral teeth small; cheek naked. Gill-rakers very short, 12 on lower part of anterior arch. Dorsal XIX 8; spines increasing in length to the last, which measures  $\frac{2}{3}$  length of head and nearly equals longest soft rays. Anal X 6; last spine a little longer than last dorsal. Pectoral  $\frac{1}{2}$  length of head. Ventral reaching vent. Caudal rounded. Caudal peduncle as long as deep. Scales  $46\frac{5}{10}$ ; lateral lines  $\frac{24-26}{23-26}$ . Yellowish, with 11 dark brown cross-bands, the first on the vertex; fins greyish, dorsal and anal edged with blackish.

Total length 70 millim.

Lake Tanganyika.

1. Type.	Kinyamkolo.	Prof. J. E. S. Moore (C.).
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## 20. LAMPROLOGUS BREVIS.

Bouleng. Ann. Mus. Congo, Zool. i. p. 115, pl. xlv. fig. 2 (1899), and Poiss. Bass. Congo, p. 405 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 294; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 561.

Depth of body  $2\frac{2}{3}$  to 3 times in total length, length of head 3 times. Head twice as long as broad; snout as long as or shorter than eye, which is  $2\frac{2}{3}$  to 3 times in length of head and equals interorbital width; mouth extending to below anterior fourth of eye; 6 canines, outer largest, in front of each jaw, followed by a narrow band of minute teeth; lateral teeth small; cheek naked. Gill-rakers rather short, 9 on lower part of anterior arch. Dorsal XVI–XVIII 6–7; spines subequal from the fifth, about  $\frac{2}{3}$  length of head; longest soft rays about  $\frac{1}{2}$  length of head. Anal VII–IX 5–6; last spine as long as longest dorsals. Pectoral about  $\frac{2}{3}$  length of head. Ventral reaching origin of anal or a little beyond. Caudal rounded. Caudal peduncle deeper than long.

Fig. 329.

*Lamprologus brevis.*

Type (A. M. C.).

Scales 30–35  $\frac{3}{13}$ ; lateral lines  $\frac{14-18}{6-8}$ . Uniform brown above, whitish beneath; a black opercular spot; fins brown, without spots, dorsal tipped with black, ventrals black at the end.

Total length 45 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

1–2. Ad.

Rumonge.

Dr. W. A. Cunningham (C.).

## 21. LAMPROLOGUS MOORII.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 8, pl. i. fig. 4, and Poiss. Bass. Congo, p. 404 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 292.

Depth of body  $2\frac{1}{2}$  times in total length, length of head 3 or  $3\frac{1}{2}$  times. Head twice as long as broad; snout as long as eye, which is 3 to  $3\frac{1}{3}$  times in length of head and equals interorbital width; mouth extending to below anterior border of eye; 8 to 10 rather large canines in front of each jaw, followed by a moderately broad band of minute teeth; lateral

teeth small; cheek naked or with deciduous scales. Gill-rakers short, 9 or 10 on lower part of anterior arch. Dorsal XIX-XX 8-9; spines increasing slightly in length to the last, which measures nearly  $\frac{1}{2}$  length of head; median soft rays produced, at least  $\frac{3}{4}$  length of head. Anal VII-VIII 6-7; last spine a little longer than longest dorsal. Pectoral  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head. Ventral produced into a long filament. Caudal rounded. Caudal peduncle as long as deep. Scales 33-35  $\frac{5-7}{11-12}$ ; lateral lines  $\frac{24-28}{9-13}$ . Dark brown; fins blackish.

Total length 93 millim.

Lake Tanganyika.

1-3 Types.

Mbity Rocks.

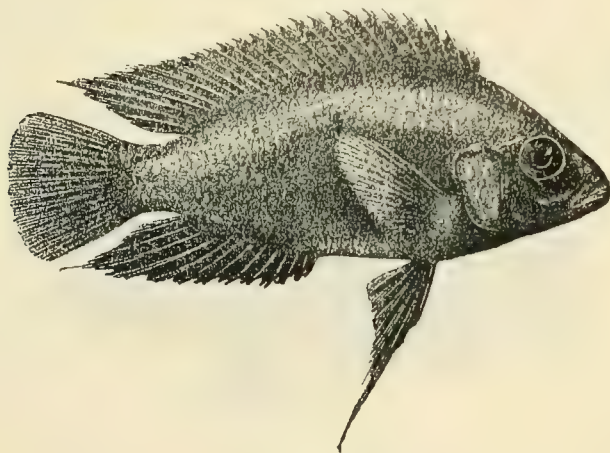
Prof. J. E. S. Moore (C.).

4-5. Types.

Kinyamkolo.

”

Fig. 330.



*Lamprologus moorii*.

Type (Tr. Z. S. 1898).  $\frac{5}{6}$ .

## 22. LAMPROLOGUS COMPRESSICEPS.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 7, pl. i. fig. 3, and Poiss. Bass. Congo, p. 405 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 294.

Depth of body  $2\frac{1}{2}$  to  $2\frac{3}{4}$  times in total length, length of head  $2\frac{3}{5}$  to  $2\frac{3}{4}$  times. Head strongly compressed,  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times as long as broad, with concave upper profile; snout a little longer than eye, which is 3 (young) to 4 times in length of head and exceeds interorbital width; mouth extending to below anterior border of eye; præmaxillary processes very long, extending far between the orbits; 6 large canines in front of upper jaw and 4 in front of lower, followed by a narrow



band of minute teeth; lateral teeth rather small; cheek naked. Gill-rakers moderately long, 15 on lower part of anterior arch. Dorsal XX-XXI 6; spines increasing in length to the sixth, which measures  $\frac{1}{2}$  length of head, the last a little shorter. Anal X 5; last spine as long as last dorsal. Pectoral  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Ventral produced into a filament. Caudal rounded. Caudal peduncle as long as deep or a little deeper than long. Scales 32-33  $\frac{5}{12}$ ; lateral lines  $\frac{22-23}{9-10}$ . Brown, uniform or with traces of five darker vertical bars, which are more distinct in the young; pectoral bright yellow, other fins brown, blackish towards the edge.

Total length 83 millim.

Lake Tanganyika.

1-2. Types.

Kinyamkolo.

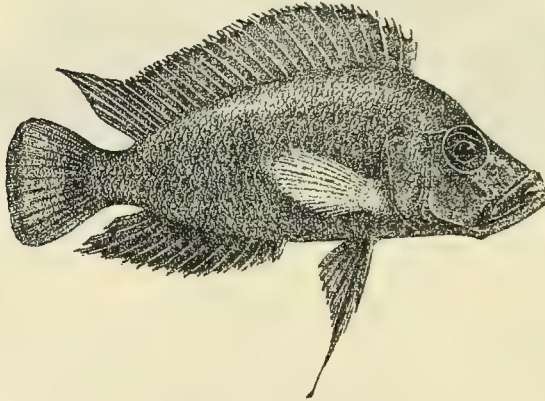
Prof. J. E. S. Moore (C.).

3. Yg.

Niamkolo.

Dr. W. A. Cunningham (C.).

Fig. 331.



*Lamprologus compressiceps.*

Type (Tr. Z. S. 1898).  $\frac{5}{6}$ .

### 23. LAMPROLOGUS TÆNIURUS.

Bouleng. Rev. Zool. Afr. iii. 1914, p. 444.

Depth of body  $2\frac{2}{3}$  to  $2\frac{5}{6}$  times in total length, length of head 3 times. Head twice as long as broad; snout as long as or a little shorter than eye, which is  $2\frac{2}{3}$  to 3 times in length of head and equals interorbital width; mouth extending to below anterior border or anterior fourth of eye; 4 or 6 canines, outer largest, in front of each jaw, followed by a narrow band of minute teeth; lateral teeth small; cheek naked. Gill-rakers long and slender, 23 to 25 on lower part of anterior arch. Dorsal

XVIII-XIX 8; spines increasing in length to the last, which measures  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head; longest soft rays  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Anal VII-VIII 7-8; last spine as long as longest dorsal. Pectoral  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Ventral produced into a filament, extending beyond origin of anal. Caudal rounded. Caudal peduncle deeper than long. Scales 35-38  $\frac{4-5}{12-13}$ ; lateral lines  $\frac{12-23}{2-8}$ . Brownish; caudal peduncle and base of caudal with darker vertical bars; a black opercular spot; dorsal and anal edged with blackish.

Total length 60 millim.

Lake Tanganyika.—Types in Congo Museum, Tervueren.

1-2. Two of the types.

Tulo.

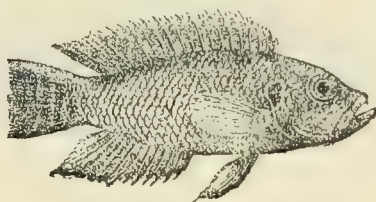
Dr. L. Stappers (C.).

#### 24. LAMPROLOGUS CALLIURUS.

Bouleng. Tr. Zool. Soc. xvii. 1906, p. 560, pl. xxxv. fig. 5.

Depth of body  $2\frac{3}{4}$  to 3 times in total length, length of head 3 times. Head twice as long as broad; snout a little shorter than eye, which is

Fig. 332.



*Lamprologus calliurus.*

Type (Tr. Z. S. 1906).

3 times in length of head and a little greater than interorbital width; mouth extending to below anterior border of eye; 6 or 8 canines in front of each jaw, outer strong, curved, followed by a narrow band of minute teeth; lateral teeth small; cheek naked. Gill-rakers long and slender, 14 to 16 on lower part of anterior arch. Dorsal XVII-XVIII 7; spines subequal from the eighth or ninth, about  $\frac{1}{2}$  length of head; soft rays a little longer. Anal VIII 6-8; last spine nearly as long as longest dorsals. Pectoral  $\frac{2}{3}$  length of head. Ventral extending beyond origin of anal. Caudal truncate. Caudal peduncle a little deeper than long. Scales 35-36  $\frac{3-4}{12-13}$ ; lateral lines  $\frac{15-23}{3-10}$ . Yellow, brownish on the back, with rather indistinct darker bars across the back and across the caudal

fin; a sharply defined black opercular spot, edged with silvery in front.

Total length 50 millim.

Lake Tanganyika.

1-2. Types.

Tembwi.

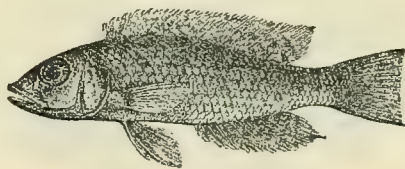
Dr. W. A. Cunningham (C.).

## 25. LAMPROLOGUS RETICULATUS.

Bouleng. Tr. Zool. Soc. xvii. 1906, p. 560, pl. xxxv. fig. 4.

Depth of body 4 times in total length, length of head  $3\frac{1}{4}$  times. Head twice as long as broad; snout as long as eye, which is  $3\frac{1}{4}$  times in length of head and equals interorbital width; mouth extending to below anterior fourth of eye; 10 small canines in front of each jaw, followed by a narrow band of minute teeth; lateral teeth very small; a few scales on the cheek. Gill-rakers short, 14 on lower part of anterior arch. Dorsal XIX 10; spines increasing in length to the last, which

Fig. 333.



*Lamprologus reticulatus.*

Type (Tr. Z. S. 1906).  $\frac{5}{8}$ .

measures  $\frac{1}{2}$  length of head and is but slightly shorter than longest soft rays. Anal VIII 8; last spine as long as last dorsal. Pectoral  $\frac{3}{4}$  length of head. Ventral reaching anal. Caudal truncate, slightly emarginate. Caudal peduncle  $1\frac{1}{2}$  times as long as deep. Scales  $39\frac{4}{13}$ ; lateral lines  $\frac{27}{14}$ . Brown, the scales edged with darker, the dark lines forming a reticulate pattern; dorsal and anal fins dark brown, with oblique rows of round whitish spots; caudal brown, with numerous, rather indistinct, light spots at the base, and an oblique whitish streak in the upper corner.

Total length 62 millim.

Lake Tanganyika.

1. Type.

Vua.

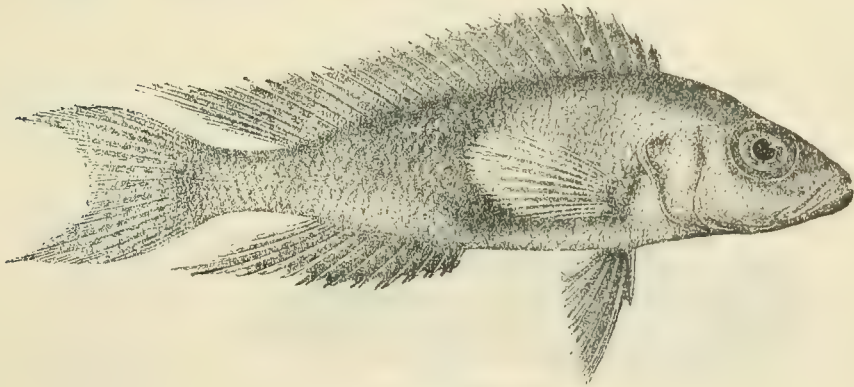
Dr. W. A. Cunningham (C.).

## 26. LAMPROLOGUS FURCIFER.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 9, pl. ii. fig. 1, and Poiss. Bass. Congo, p. 407 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 295.

Depth of body 4 to  $4\frac{1}{2}$  times in total length, length of head  $2\frac{4}{5}$  to 3 times. Head twice as long as broad; snout as long as or a little longer than eye, which is  $3\frac{1}{4}$  to  $3\frac{2}{3}$  times in length of head and exceeds interorbital width; mouth extending to below anterior fourth of eye; 6 large canines, wide apart, in front of upper jaw, and 4 in front of lower, followed by a moderately broad band of minute teeth; lateral teeth very small; cheek with deciduous scales. Gill-rakers short, 14 to 16 on lower part of anterior arch. Dorsal XIX–XXI 7–9; spines increasing in length to the last, which measures  $\frac{2}{5}$  length of head;

Fig. 334



*Lamprologus furcifer.*  
Type (Tr. Z. S. 1898).  $\frac{5}{16}$ .

some of the soft rays produced,  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Anal VI–VII 5–6; last spine as long as last dorsal. Pectoral  $\frac{3}{4}$  length of head. Ventral reaching vent or origin of anal. Caudal with deep crescentic notch. Caudal peduncle  $1\frac{1}{2}$  to 2 times as long as deep. Scales 50–60  $\frac{6-8}{16-20}$ ; lateral lines  $\frac{32-48}{10-31}$ . Dark brown, with very indistinct blackish cross-bars on the body; spinous dorsal and ventrals blackish; round black spots on the soft dorsal and caudal; caudal lobes tipped with whitish.

Total length 125 millim.

Lake Tanganyika.



1-2. Types.	Kinyamkolo.	Prof. J. E. S. Moore (C.).
3-5. Ad. & hgr.	Msambu.	..
6. Ad.	Mbity Rocks.	..
7. Ad.	L. Tanganyika.	..
8. Skel.	"	"

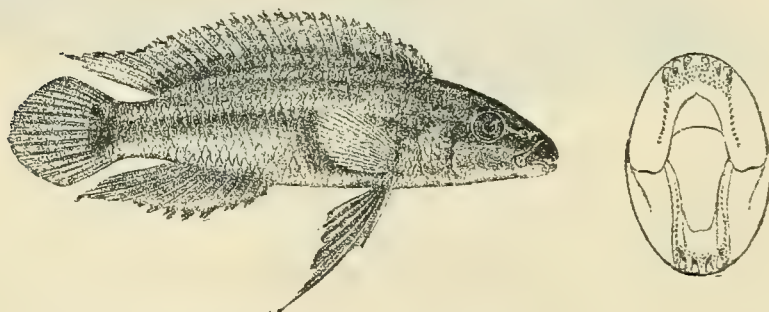
## 28. JULIDOCHROMIS.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 11, and Poiss. Bass. Congo, p. 408 (1901);  
 Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 296.

Body elongate; scales strongly denticulate, very small on nape and anterior part of back; two incomplete lateral lines. Mouth narrow, with massive mandible; teeth conical, forming a villiform band, with a few strongly curved canines in front, the outer of which are very large. End of maxillary exposed. Dorsal with 22 to 24 spines, anal with 8 or 9. Occipital and parietal crests strong, the former extending to between the orbits; suborbital replaced by a ligament. Vertebrae 34 (17+17).

Lake Tanganyika.

Fig. 335.

*Julidochromis ornatus.*

Type (Tr. Z. S. 1898).  $\frac{5}{6}$ .

## 1. JULIDOCHROMIS ORNATUS.

Bouleng. ll. cc. p. 12, pl. ii. fig. 4, and p. 408; Pellegr. l. c.

Depth of body 4 to  $4\frac{1}{2}$  times in total length, length of head  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times. Head twice as long as broad, with convex upper profile; snout  $1\frac{1}{2}$  to 2 times as long as eye, which is  $4\frac{1}{2}$  to 5 times in length of head and  $1\frac{1}{2}$  times in interorbital width; mouth extending to below nostril; 4 or 6 canines in each jaw; cheek naked. Gill-rakers very short and few. Dorsal XXII-XXIV 5; spines equal from the eighth or tenth,

$\frac{1}{2}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Anal VIII–IX 4–6; last spine  $\frac{2}{3}$  length of head. Pectoral about  $\frac{2}{3}$  length of head. Ventral produced into a filament, reaching origin of anal. Caudal rounded. Caudal peduncle as long as deep. Scales 45–50  $\frac{6-7}{12-13}$ ; lateral lines  $\frac{26-29}{10-15}$ . Yellowish, with three dark brown stripes on each side, the lowermost from the end of the snout to the base of the caudal, the uppermost along the base of the dorsal; a large round dark brown spot on the base of the caudal; a small black spot at the base of the pectoral; anal edged with brown; caudal brown.

Total length 85 millim.

Lake Tanganyika.

1–3. Types.	Mbity Rocks.	Prof. J. E. S. Moore (C.).
4. Skel.	"	"
5. Ad.	L. Tanganyika.	"

## 29. TELMATOCROMIS.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 10, and Poiss. Bass. Congo, p. 446 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 297.

Body elongate; scales strongly denticulate, very small on nape and anterior part of back; two incomplete lateral lines. Jaws with an outer series of large conical teeth and a broad band of small tricuspid teeth. End of maxillary exposed. Dorsal with 18 to 22 spines, anal with 6 or 7. Occipital crest strong, extending to between the orbits; no parietal crests; præmaxillary processes extending to between the orbits. Vertebrae 33 (16+17).

Lake Tanganyika.

Two species:—

- D. XVIII–XXI 6–8; Sc. 40–47  $\frac{4-6}{12-15}$ ; depth of body  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times in total length . . . 1. *T. temporalis*, Blgr., p. 485.  
 D. XXI–XXII 8; Sc. 45–52  $\frac{6}{10}$ ; depth of body  $4\frac{1}{2}$  to  $4\frac{2}{3}$  times in total length . . . 2. *T. vittatus*, Blgr., p. 486.

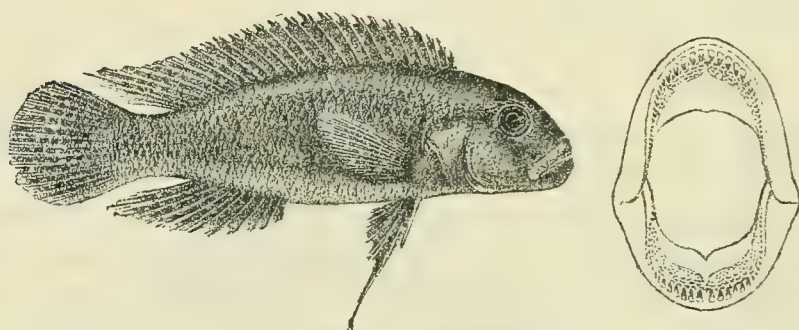
### 1. TELMATOCROMIS TEMPORALIS.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 11, pl. ii. fig. 3, and Poiss. Bass. Congo p. 447 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 297; Bouleng. Tr. Zool. Soc. xvii. 1901, p. 561.

Depth of body  $3\frac{1}{4}$  to  $3\frac{1}{2}$  times in total length, length of head 3 to

$3\frac{1}{4}$  times. Head twice as long as deep; the profile descending in a curve; snout about  $1\frac{1}{2}$  times as long as eye, which is 4 to  $4\frac{1}{2}$  times in length of head and equal to or a little less than interorbital width; mouth extending to below anterior border of eye; 8 to 12 large conical teeth in each jaw; cheek naked. Gill-rakers very short and few. Dorsal XVIII–XXI 6–8; spines increasing in length to the last, which measures  $\frac{1}{3}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{2}{3}$  to  $\frac{3}{4}$  length of head. Anal VI–VII 6–7; last spine as long as or a little longer than last dorsal. Pectoral about  $\frac{2}{3}$  length of head. Ventral produced into a filament, extending beyond origin of anal. Caudal rounded. Caudal peduncle as long as deep or a little deeper than long. Scales 40–47  $\frac{4-6}{12-15}$ ; lateral lines  $\frac{14-30}{3-17}$ . Brown or olive, with or without irregular

Fig. 336.

*Telmatochromis temporalis.*Type (Tr. Z. S. 1898).  $\frac{5}{6}$ .

dark blotches, the young sometimes with dark cross-bars; a dark or orange band from the eye to the gill-cover; a vertical black bar, which may be edged with whitish behind, at the base of the pectoral; vertical fins with round dark spots, caudal and anal sometimes spotted with yellow and white.

Total length 85 millim.

Lake Tanganyika.

1–2. Types.	Kinyamkolo.	Prof. J. E. S. Moore (C.).
3. Type.	Mbity Rocks.	„
4. Ad.	Kibwesi.	„
5. Skel.	„	„
6–7. Hgr.	Mshale.	Dr. W. A. Cunningham (C.).
8. Yg.	Niamkolo Id.	„

9. Hgr.	Kituta.	Dr. W. A. Cunningham (C.).
10-14. Y <sup>g</sup> .	Mtondwe Bay.	"
15. Ad.	Kilewa Bay.	Dr. L. Stappers (C.).
16. Yg.	L. Tanganyika.	Prof. J. E. S. Moore (C.).

2. TELMATOCHROMIS VITTATUS.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 10, pl. ii. fig. 2, and Poiss. Bass. Congo, p. 446 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 298.

Depth of body  $4\frac{1}{2}$  to  $4\frac{2}{3}$  times in total length, length of head 4 times. Head twice as long as broad; profile of snout descending in a strong curve; snout as long as or a little longer than eye, which is  $3\frac{2}{3}$  to 4 times in length of head and equals interorbital width; mouth extending to below nostril; 12 to 16 large conical teeth in each jaw; cheek naked. Gill-rakers very short and few. Dorsal XXI-XXII 8;

Fig. 337.



*Telmatochromis vittatus.*

Type (Tr. Z. S. 1898).  $\frac{5}{8}$ .

spines increasing in length to the last, which measures  $\frac{1}{2}$  length of head and a little less than longest soft rays. Anal VII 5-6; last spine as long as last dorsal. Pectoral  $\frac{3}{4}$  length of head. Ventral produced into a short filament, reaching origin of anal. Caudal rounded. Caudal peduncle as long as deep. Scales 45-52  $\frac{6}{10}$ ; lateral lines  $\frac{25-29}{13-15}$ . Yellowish; a dark brown lateral band from the upper lip, through the eye, to the base of the caudal where it ends in a round spot; a second band commences on the vertex and extends along the base of the dorsal; a few dark brown spots on the dorsal; anal edged with dark brown; a vertical black bar at the base of the pectoral.

Total length 78 millim.

Lake Tanganyika.

1-2. Types.	Mbity Rocks.	Prof. J. E. S. Moore (C.).
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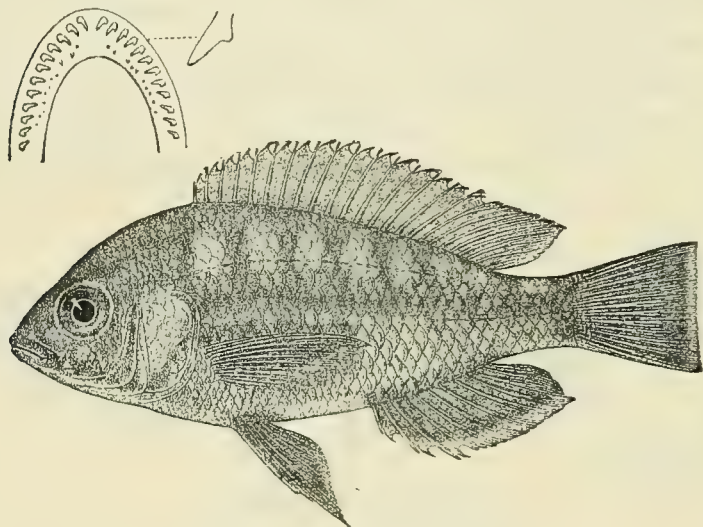
## 30. BAYONIA.

Bouleng. Ann. Mus. Genova, (3) v. 1911, p. 70.

Near *Hemitilapia*, but teeth much larger and fewer, in two series, the outer with very large compressed crowns, with long anterior cusp directed inwards and very short or indistinct posterior cusp, the inner minute and conical.

Victoria Nile.

Fig. 338.



*Bayonia xenodonta*.

Type (Ann. Mus. Genova, 1911).

## 1. BAYONIA XENODONTA.

Bouleng. l. c. pl. ii. fig. 4.

Depth of body  $2\frac{1}{2}$  times in total length, length of head 3 times. Head twice as long as broad, upper profile descending in an even curve; snout rounded, as long as broad, as long as eye, which is  $3\frac{1}{3}$  times in length of head and equals interorbital width; jaws equal in front; mouth extending to below anterior border of eye; 24 teeth in outer row of upper jaw; inner teeth small and few; three series of scales on the cheek, the depth of the scaly part below the eye less than the diameter of the latter. Gill-rakers short, 9 on lower part of anterior arch. Dorsal XVI 9; spines increasing in length to the last, which measures nearly  $\frac{1}{2}$  length of head; longest soft rays a little more than  $\frac{1}{2}$  length of head. Anal III 9; third spine longest, not quite  $\frac{1}{2}$  length

of head. Pectoral as long as head, reaching vertical of origin of anal. Ventral reaching origin of anal. Caudal truncate. Caudal peduncle a little longer than deep. Scales feebly denticulate,  $32 \frac{4}{11}$ ; lateral lines  $\frac{21-22}{11-13}$ . Brownish above, whitish beneath, with eight darker cross-bars, traversed by a dark lateral stripe extending from the opercular spot to the caudal; vertical fins uniform brownish, paired fins whitish.

Total length 90 millim.

Victoria Nile (Ripon Falls).—Type in Genoa Museum.

### 31. **HEMITILAPIA.**

Bouleng. Ann. & Mag. N. H. (7) x. 1902, p. 70.

Body moderately elongate; scales ctenoid; two incomplete lateral lines. Jaws with moderately broad bands of slender, club-shaped, movable teeth, with slightly incurved crowns, those of the outer series larger, with the crown obliquely truncate and pointing towards the symphysis. Maxillary exposed at the end. Dorsal with 15 or 16 spines, anal with 3. Occipital and parietal crests strong, extending to between the orbits. Vertebrae 31 (14-15+16-17).

Lakes Nyassa and Victoria.

#### *Synopsis of the Species.*

- Snout pointed, with straight or concave upper profile; pectoral a little shorter than head; caudal peduncle a little longer than deep; Sc.  $34-36 \frac{3-4}{11}$ . . . . . 1. *H. oxyrhynchus*, Blgr., p. 489.
- Snout obtuse, with straight upper profile; pectoral as long as head; caudal peduncle  $1\frac{1}{2}$  times as long as deep; Sc.  $31-32 \frac{4-5}{12-13}$ . . . . . 2. *H. bayoni*, Blgr., p. 491.
- Snout obtuse, with convex upper profile; pectoral at least as long as head; caudal peduncle not or but slightly longer than deep; Sc.  $31-33 \frac{6-7}{11-12}$ . . . . . 3. *H. materfamilias*, Pellegr., [p. 492.

### 1. **HEMITILAPIA OXYRHYNCHUS.**

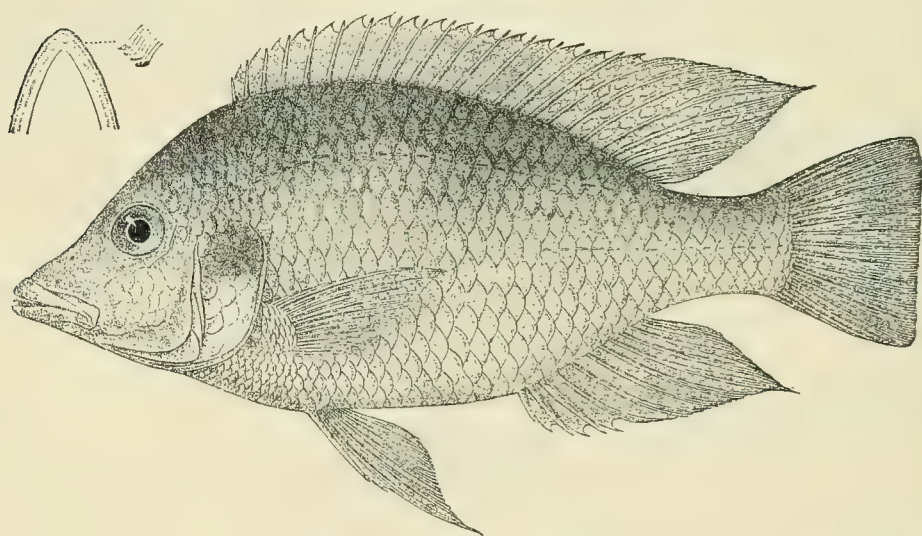
Bouleng. Ann. & Mag. N. H. (7) x. 1902, p. 71.

*Tilapia oxyrhynchus*, Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 334.

Depth of body  $2\frac{1}{2}$  to  $2\frac{3}{4}$  times in total length, length of head 3 times. Head  $2\frac{1}{4}$  to  $2\frac{1}{3}$  times as long as broad, with concave upper profile; snout

pointed,  $1\frac{1}{4}$  (young) to 2 times as long as eye, which is  $3\frac{1}{4}$  to nearly 5 times in length of head and nearly equals interorbital width; mouth extending to between nostril and eye; teeth in 3 or 4 series in each jaw, the outer much larger than the others and numbering 50 to 80 in upper jaw; 3 or 4 series of scales on the cheek. Gill-rakers short, 12 or 13 on lower part of anterior arch. Dorsal XVI 10-11; spines increasing in length to the last, which measures  $\frac{2}{5}$  to nearly  $\frac{1}{2}$  length of head; longest soft rays nearly as long as head in adult,  $\frac{1}{2}$  in young. Anal III 9; third spine shorter than last dorsal. Pectoral shorter than head, not extending to vertical of origin of anal. Ventral not reaching

Fig. 339.

*Hemitilapia oxyrhynchus.*Type.  $\frac{2}{3}$ .

anal. Caudal truncate. Caudal peduncle a little longer than deep. Scales very finely denticulate, 34-36  $\frac{3-4}{11}$ ; lateral lines  $\frac{21-22}{10-15}$ . Brown above, whitish beneath; a blackish opercular spot; young with a dark brown blotch on each side of the back below the spinous dorsal, a second below the soft dorsal, and a third at the base of the caudal fin; small round light spots on the soft dorsal.

Total length 180 millim.

Lake Nyassa.

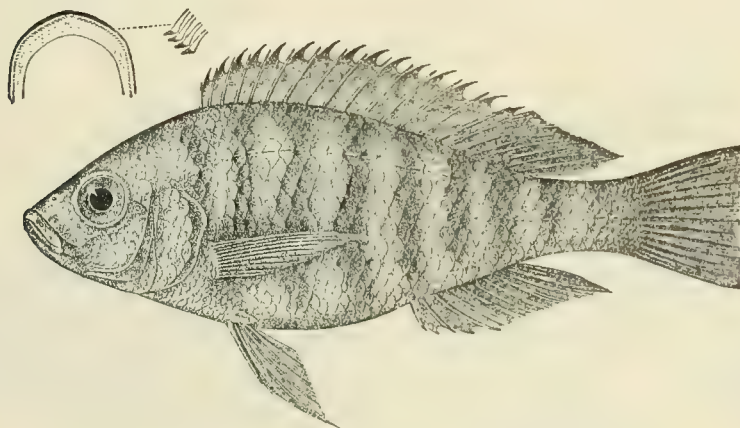
1. Type.	L. Nyassa.	Prof. J. E. S. Moore (C.).
2. Skel.	"	"
3. Yg.	"	Capt. E. L. Rhoades (P.).

## 2. HEMITILAPIA BAYONI.

Bouleng. Ann. Mus. Genova, (3) iv. 1908, p. 6, fig., and v. 1911, p. 69.

Depth of body  $2\frac{2}{3}$  to  $2\frac{3}{4}$  times in total length, length of head 3 to  $3\frac{1}{4}$  times. Head 2 to  $2\frac{1}{3}$  times as long as broad; snout obtuse, with straight upper profile, as long as eye, which is  $3\frac{1}{4}$  or  $3\frac{1}{3}$  times in length of head and equals interorbital width; mouth extending nearly to below anterior border of eye; four series of teeth in each jaw, the outer much larger than the others and numbering 50 to 60 in upper jaw; 3 series of scales on the cheek. Gill-rakers short, 9 or 10 on

Fig. 340.



*Hemitilapia bayoni*.

Type (Ann. Mus. Genova, 1908).

lower part of anterior arch. Dorsal XV–XVI 9; spines increasing in length to the last, which measures about half length of head; longest soft ray about  $\frac{2}{5}$  length of head. Anal III 8–9; third spine longest, nearly half length of head. Pectoral pointed, as long as head, not quite reaching vertical of origin of anal. Ventral reaching vent. Caudal truncate. Caudal peduncle  $1\frac{1}{2}$  times as long as deep. Scales denticulate, 31–32  $\frac{4-5}{12-13}$ ; lateral lines  $\frac{19-22}{3-8}$ . Yellowish olive, with or without 7 to 9 more or less distinct darker vertical bars on the body; a dark opercular spot; fins greyish, ventrals blackish at the end in males.

Total length 95 millim.

Lake Victoria and Victoria Nile.—Types in Genoa Museum.



1. One of the types.	Sesse Ids.	Dr. E. Bayon (C.);	
		Genoa Museum (P.).	
2. Ad.	"	"	"
3. Skel.	"	"	"
4-9. Ad. & hgr.	L. Victoria.	"	"
10. Ad.	Jinja, Ripon Falls.	"	"

### 3. HEMITILAPIA MATERFAMILIAS.

Pellegr. Bull. Soc. Zool. France, xxxvii. 1913, p. 313.

Depth of body  $2\frac{1}{2}$  to  $2\frac{4}{5}$  times in total length, length of head  $2\frac{3}{4}$  to 3 times. Head with curved upper profile; snout obtuse; eye 3 to  $3\frac{1}{2}$  times in length of head, equal to or a little less than length of snout or interorbital width; lower jaw feebly projecting; mouth extending to below anterior border of eye; teeth in 5 or 6 series in the upper jaw; 3 or 4 series of scales on the cheek. 8 or 9 gill-rakers on lower part of anterior arch. Dorsal XV-XVI 9; spines slightly increasing in length posteriorly, last  $2\frac{1}{4}$  to  $2\frac{1}{2}$  times in length of head. Anal III 8-9; third spine slightly shorter than last dorsal. Pectoral as long as or a little longer than length of head, extending beyond vertical of origin of anal. Ventral reaching anal. Caudal truncate. Caudal peduncle as long as or a little longer than deep. Scales denticulate, 31-33  $\frac{6-7}{11-12}$ . Olive above, silvery beneath; 7 or 8 dark bars on the body, and a better-defined black longitudinal band on the posterior part of the body.

Total length 138 millim.

Lake Victoria.—Types in Paris Museum.

### 32. CHILOCHROMIS.

Bouleng. Proc. Zool. Soc. 1902, ii. p. 236; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 353.

Body moderately elongate; scales cycloid; two incomplete lateral lines. Jaws with very broad bands of bristle-like movable teeth with club-shaped inbent crowns; rami of lower jaw approximated, spatulate in front, connected with the upper jaw by a broad thin lip. Maxillary concealed under the præorbital when the mouth is closed. Dorsal fin with 16 or 17 spines, anal with 3.

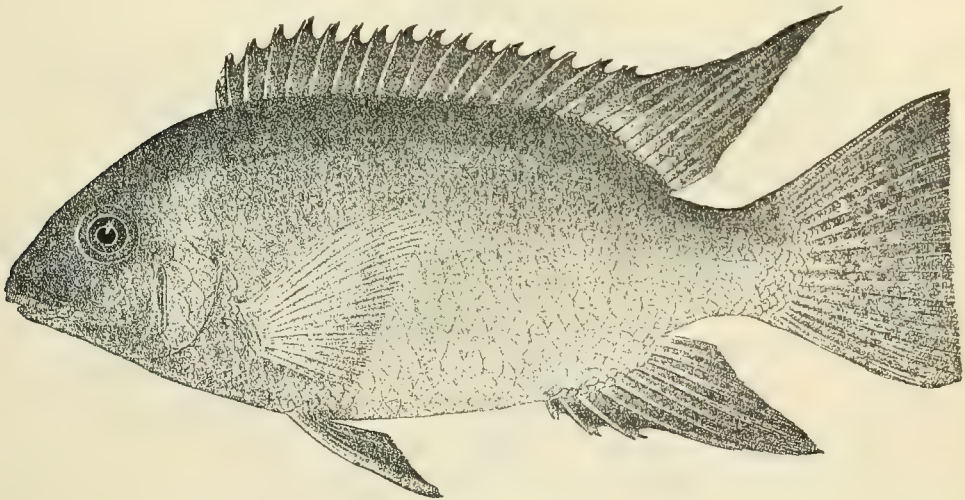
Chiloango System.

## 1. CHILOCHROMIS DUPONTI.

Bouleng. l. c. pl. xxiv. ; Pellegr. l. c. ; Bouleng. Ann. Mus. Congo, Zool. ii. 3, 1912, p. 26.

Depth of body  $2\frac{1}{2}$  times in total length, length of head  $3\frac{1}{2}$  times. Head not quite twice as long as broad. Snout rounded, a little broader than long, with arched upper profile, longer than eye, which is  $3\frac{1}{2}$  to 4 times in length of head,  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times in interorbital width ; mouth extending to below nostril ; upper lip very broad ; teeth very numerous, those of upper jaw in 8 or 9 series, of lower jaw forming two spoon-shaped groups ; inner teeth smaller than outer ; 3 or 4 series of scales on the cheek. Gill-rakers short, 15 or 16 on lower part of anterior arch. Dorsal XVI-XVII 10-11 ; spines increasing in length to the last, which is  $\frac{2}{5}$  length of head ; longest soft rays a little longer or a

Fig. 341.



*Chilochromis duponti*.  
Type (P. Z. S. 1902).  $\frac{5}{8}$ .

little shorter than head. Anal III 8 ; third spine a little shorter than last dorsal. Pectoral as long as or a little shorter than head, not extending to vertical of origin of anal. Ventral not reaching vent. Caudal truncate or feebly emarginate. Caudal peduncle as long as deep. Scales 30-33  $\frac{2\frac{1}{2}-3\frac{1}{2}}{10}$  ; lateral lines  $\frac{21-22}{10-13}$ . Uniform olive-brown above, yellowish beneath ; fins greyish or brown.

Total length 220 millim.

Lukula and Luali Rivers, Chiloango.—Type in Brussels Museum.

1. Ad.            Luali R. at Buco Zau, Portuguese      Dr. W. J. Ansorge (C.).  
                         Congo.

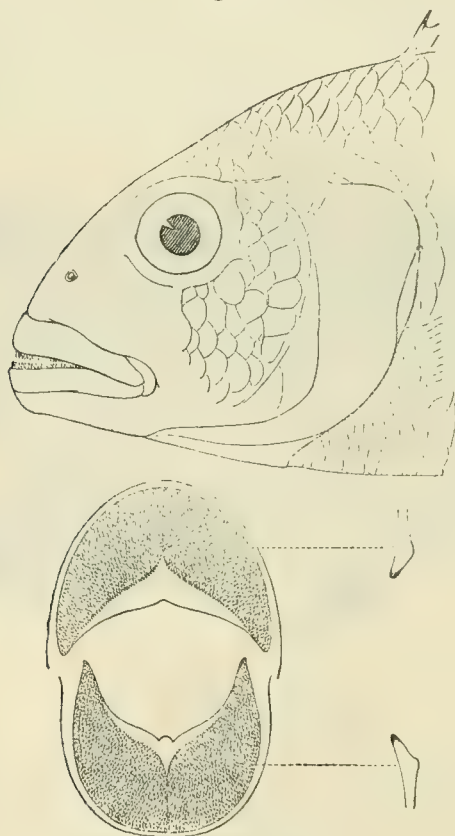
## 33. COREMATODUS.

Bouleng. Proc. Zool. Soc. 1896, p. 918, and 1898, p. 152; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 349.

Body moderately elongate; scales cycloid; two incomplete lateral lines. Jaws very massive, with extremely broad bands of innumerable minute club-shaped teeth with compressed oblique entire crowns; maxillary concealed under the præorbital when the mouth is closed. Dorsal with 16 spines, anal with 3. Vertebrae 32 (15 + 17).

Lake Nyassa (Upper Shiré River).

Fig. 342.



*Corematodus shiranus*.

Type (P. Z. S. 1896).

## 1. COREMATODUS SHIRANUS.

Bouleng. tt. cc., p. 919, fig., and p. 152; Pellegr. l. c.

Depth of body equal to length of head, 3 times in total length. Head twice as long as broad, with curved upper profile; snout broader

than long, shorter than postocular part of head; eye  $4\frac{1}{2}$  times in length of head, twice in interorbital width; mouth extending to below anterior border of eye; 4 series of scales on the cheek, depth of scaly part equal to diameter of eye. Gill-rakers moderately long, 12 on lower part of anterior arch, last bifid. Dorsal XVI 10; spines increasing in length to the last, which is  $\frac{2}{5}$  length of head. Anal III 8; third spine as long as and thicker than middle dorsals. Caudal peduncle  $1\frac{1}{2}$  times as long as deep. Scales slightly rugose,  $34\frac{3}{9}$ ; lateral lines  $\frac{20}{7}$ . Body with traces of six black cross-bars.

Total length 200 millim.

Upper Shiré River.

1. Type.

Upper Shiré.

Dr. Percy Rendall (C.).

Sir H. H. Johnston (P.).

### 34. ERETMODUS.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 16, and Poiss. Bass. Congo, p. 483 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 360.

Body moderately elongate; scales ctenoid; two incomplete lateral lines. Jaws with rather large spatulate teeth with truncated crowns disposed in oblique transverse rows of two or three; maxillary concealed when the mouth is closed. Dorsal with 23 to 25 spines, anal with 3. Toothed portions of præmaxillary and mandible much developed in depth; parietal and occipital crests extending to between the orbits. Vertebrae 30 (15+15).

Lake Tanganyika.

#### 1. ERETMODUS CYANOSTICTUS.

Bouleng. Il. cc., Tr. pl. iii. fig. 5; Pellegr. l. c.; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 574.

Depth of body equal to length of head, 3 times in total length. Head twice as long as broad; snout as long as broad, very convex,  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times as long as eye, which is  $4\frac{1}{2}$  to 5 times in length of head and a little less than interorbital width; mouth with much developed lips, extending to below nostril, or between nostril and eye; teeth with reddish-brown crowns, in 8 to 12 rows in each jaw; cheek and opercle naked. Gill-rakers short, 9 or 10 on lower part of anterior arch. Dorsal XXIII-XXV 3-5; spines subequal from the sixth, about  $\frac{1}{3}$  length of head, a little shorter than soft rays. Anal III 6-7; third



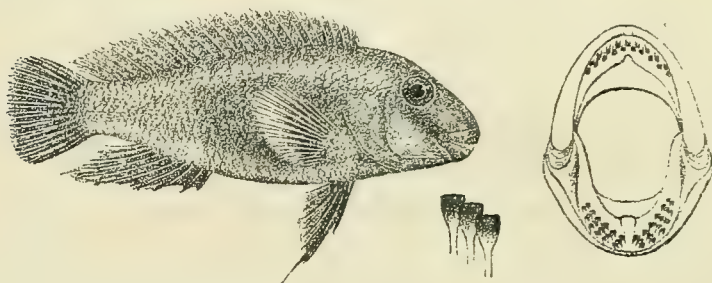
spine a little longer than dorsals. Pectoral  $\frac{3}{4}$  length of head. Ventral reaching vent. Caudal rounded. Caudal peduncle deeper than long. Scales feebly denticulate,  $32-35 \frac{3}{11-12}$ ; lateral lines  $\frac{22-23}{6-9}$ . Brownish grey or blackish brown, with scattered dots of a brilliant blue.

Total length 75 millim.

Lake Tanganyika.

1-2. Types.	Mbity Rocks.	Prof. J. E. S. Moore (C.).
3-5. Types.	Kinyamkolo.	"
6. Skel.	"	"
7-8. Yg.	Niamkolo Bay.	Dr. W. A. Cunningham (C.).
9. Ad.	Sumba.	"

Fig. 343.



*Eretmodus cyanostictus*.  
Type (Tr. Z. S. 1898).  $\frac{5}{8}$ .

### 35. SPATHODUS.

Bouleng. Ann. Mus. Congo, Zool. i. p. 152 (1900), and Poiss. Bass. Congo, p. 484 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 361.

Body moderately elongate; scales ctenoid; two incomplete lateral lines. A single series of large teeth with elongate cylindrical shaft and expanded rounded-subtruncate crown; maxillary concealed when the mouth is closed. Dorsal with 23 spines, anal with 3

Lake Tanganyika.

#### 1. SPATHODUS ERYTHRODON.

Bouleng. ll. cc., Ann. pl. lii. fig. 2; Pellegr. l. c.

Depth of body equal to length of head, 3 times in total length. Head twice as long as broad; snout as long as broad, convex,  $1\frac{1}{2}$  times as long as eye, which is 4 times in length of head and equals inter-orbital width; mouth with much developed lips, extending to below

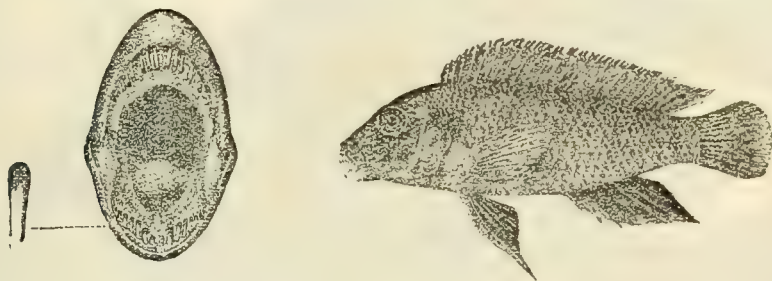
nostril; teeth with reddish-brown crowns, 16 to 20 in each jaw; cheek and opercle naked. Gill-rakers short, 10 on lower part of anterior arch. Dorsal XXIII 5; spines subequal from the fifth,  $\frac{1}{3}$  length of head; longest soft rays  $\frac{1}{2}$  length of head. Anal III 6-7; third spine a little longer than longest dorsals. Pectoral  $\frac{3}{4}$  length of head. Ventral reaching anal. Caudal rounded. Caudal peduncle deeper than long. Scales feebly denticulate, 30-31  $\frac{3}{10}$ ; lateral lines  $\frac{23}{10}$ . Blackish brown, belly whitish; caudal fin edged with whitish.

Total length 70 millim.

Lake Tanganyika.—Type in Congo Museum, Tervueren.

1. One of the types. Albertville. Capt. Hecq (C.).

Fig. 344.



*Spathodus erythrodon*.  
Type (A. M. C.).

### 36. PERISSODUS.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 20, and Poiss. Bass. Congo, p. 485 (1901);  
Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 361.

Body elongate, covered with small cycloid scales; two incomplete lateral lines. Teeth rather large, unequal in size, few, with swollen base and low slightly notched crown, compressed transversely to the axis of the jaws, disposed in a single series; maxillary exposed. Dorsal with 18 spines, anal with 3. Vertebrae 35 (17+18).

Lake Tanganyika.

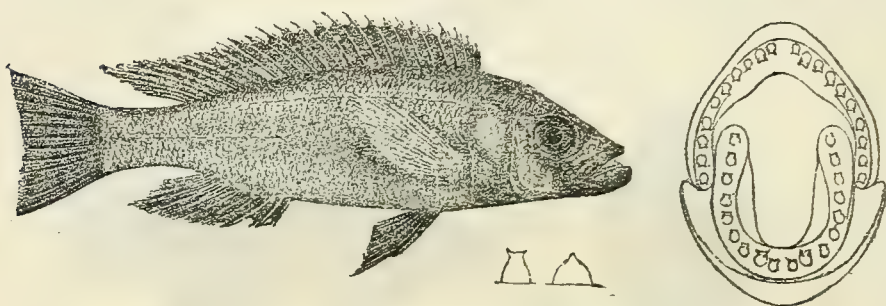
#### 1. PERISSODUS MICROLEPIS.

Bouleng. ll. cc., Tr. p. 21, pl. vi. fig. 2; Pellegr. t. c. p. 362.

Depth of body  $3\frac{2}{3}$  times in total length, length of head  $3\frac{1}{4}$  times. Head  $2\frac{1}{4}$  times as long as broad; snout a little broader than long, a

little longer than eye, which is 4 times in length of head, and almost equals interorbital width; lower jaw projecting; mouth extending to below anterior border of eye; 20 teeth in upper jaw, 18 in lower; 3 series of scales on the cheek. Gill-rakers rather long, 14 on lower part of anterior arch. Dorsal XVIII 10; spines increasing in length to the last, which measures  $\frac{2}{5}$  length of head; longest soft rays  $\frac{2}{3}$  length of head. Anal III 8; third spine nearly as long as longest dorsal. Pectoral  $\frac{3}{4}$  length of head. Ventral not reaching vent. Caudal

Fig. 345.

*Perissodus microlepis.*

Type (Tr. Z. S. 1898).  $\frac{5}{8}$ .

truncate. Caudal peduncle nearly  $1\frac{1}{2}$  times as long as deep. Scales  $65\frac{5}{20}$ ; lateral lines  $\frac{44}{30-31}$ . Uniform dark reddish brown; a blackish opercular spot.

Total length 100 millim.

Lake Tanganyika.

1. Type.

Mbity Rocks.

Prof. J. E. S. Moore (C.).

### 37. CHILOTILAPIA.

Bouleng. Ann. & Mag. N. H. (8) ii. 1908, p. 243.

Body moderately elongate; scales ctenoid; two incomplete lateral lines. Teeth in several rows, not compressed, with obtuse or rounded crowns; maxillary exposed. A large papillose pad on each side of the pharynx, forming a strong protuberance in front of the upper part of the branchial arches. Dorsal with 15 spines, anal with 3.

Lake Nyassa.

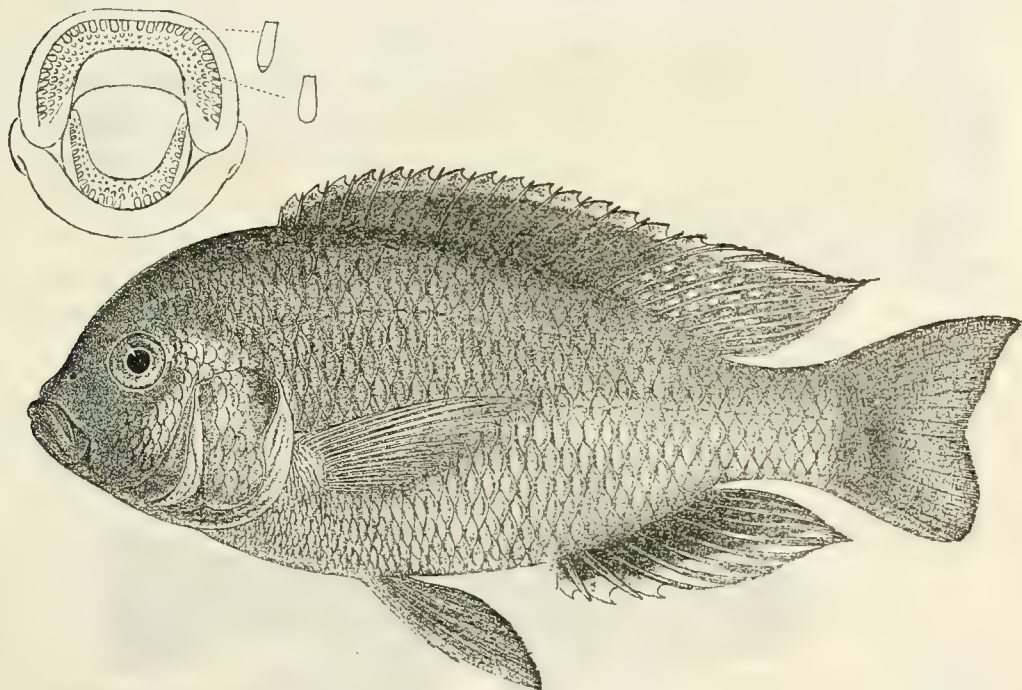


## 1. CHILOTILAPIA RHOADESII.

Bouleng. l. c.

Depth of body  $2\frac{1}{3}$  times in total length, length of head 3 times. Head  $1\frac{2}{3}$  times as long as broad; snout short, upper profile descending abruptly; eye  $4\frac{1}{2}$  times in length of head,  $1\frac{2}{3}$  times in interorbital width; mouth extending to between nostril and eye; lips very thick; teeth in

Fig. 346.



*Chilotilapia rhoadesii*.

Type.  $\frac{5}{8}$ .

5 irregular series, outer largest; 4 series of scales on the cheek. Gill-rakers rather short, 11 on lower part of anterior arch. Dorsal XV 10; spines increasing in length to the last, which is a little less than  $\frac{1}{2}$  length of head; longest soft rays  $\frac{2}{3}$  length of head. Anal III 9; third spine stronger, but a little shorter, than last dorsal. Pectoral as long as head, extending to vertical of origin of anal. Ventral reaching a little beyond origin of anal. Caudal densely scaled, feebly emarginate. Caudal peduncle  $1\frac{1}{3}$  times as long as deep. Scales finely denticulate,  $34\frac{4}{13}$ ;



lateral lines  $\frac{21}{18}$ . Dark blue; dorsal and anal fins broadly edged with orange; soft dorsal with small ocellar spots; pectoral yellowish.

Total length 220 millim.

Lake Nyassa.

1. Type.

L. Nyassa.

Capt. E. L. Rhoades (P.).

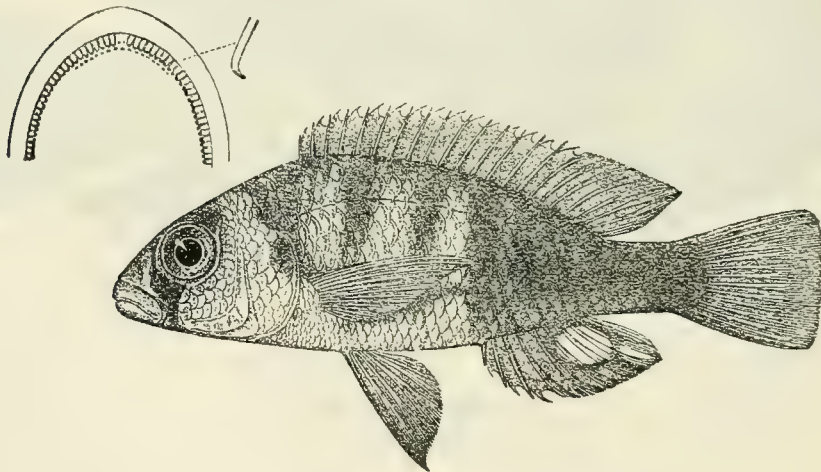
### 38. SCHUBOTZIA.

Bouleng. in Schubotz, Wiss. Ergebn. Deutsch. Z.-Afr. Exped. v., Zool. iii. p. 258 (1914).

Body rather elongate; scales moderately large, ctenoid; two incomplete lateral lines. A series of large teeth with strongly incurved, flattened, rounded crowns, without any gaps between them, followed by two series of minute obtusely tricuspid teeth; maxillary exposed. Dorsal fin with 15 or 16 spines, anal with 3.

Lake Albert Edward.

Fig. 347.



*Schubotzia eduardiana*.

Type (Deutsch. Z.-Afr. Exped.).

#### 1. SCHUBOTZIA EDUARDIANA.

Bouleng. l. c. pl. vii. figs. 2 & 3.

Depth of body nearly equal to length of head,  $2\frac{4}{5}$  to 3 times in total length. Head twice as long as broad, with curved upper profile; snout rounded, as long as broad or slightly broader than long, shorter than postocular part of head; eye as long as or a little longer than snout,

$3\frac{1}{4}$  to  $3\frac{1}{2}$  times in length of head, equal to interorbital width, and twice præorbital depth; mouth with rather thick lips, extending to below anterior border of eye or a little beyond; 50 to 54 teeth in outer series of upper jaw; 3 or 4 series of scales on the cheek, width of scaly part less than diameter of eye. Gill-rakers moderately long, 8 or 9 on lower part of anterior arch. Dorsal XV–XVI 8–9; spines increasing in length to the last, which measures  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{3}{5}$  length of head. Anal III 7–8. Pectoral as long as head, extending to vertical of origin of anal. Ventral reaching origin of anal or beyond. Caudal truncate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  times as long as deep. Scales finely denticulate, 31–32  $\frac{3\frac{1}{2}-4}{13-15}$ ; lateral lines  $\frac{20-22}{10-13}$ . Male yellowish brown in front, brown behind, with dark brown bars; two dark brown bars across the snout, a broader bar from eye to eye across the back of the head, and a vertical bar below anterior half of eye; fins yellowish, anal with two large bright, dark-edged ocellar spots. Female pale brown above and silvery white beneath, without markings except a dark opercular spot; dorsal and caudal pale greyish, with or without small round darker spots, other fins white.

Total length 95 millim.

Lake Albert Edward.—Types in Berlin Museum.

1. One of the types. L. Albert Edward. Dr. H. Schubotz (C.);  
German C. African Exped.

### 39. XENOCHROMIS.

Bouleng. Ann. Mus. Congo, Zool. i. p. 125 (1899), and Poiss. Bass. Congo, p. 486 (1901); Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 363.

Body elongate, covered with small cycloid scales; two lateral lines, the upper nearly complete. Teeth in a single series, small, compressed, lamellar and a little concave in front, obtusely pointed, strongly curved, equal in size, close together and pressed against the edge of the jaw; maxillary exposed. Dorsal with 16 or 17 spines, anal with 3. Parietal and occipital crests very strong, extending to between the orbits. Vertebrae 35 (17+18).

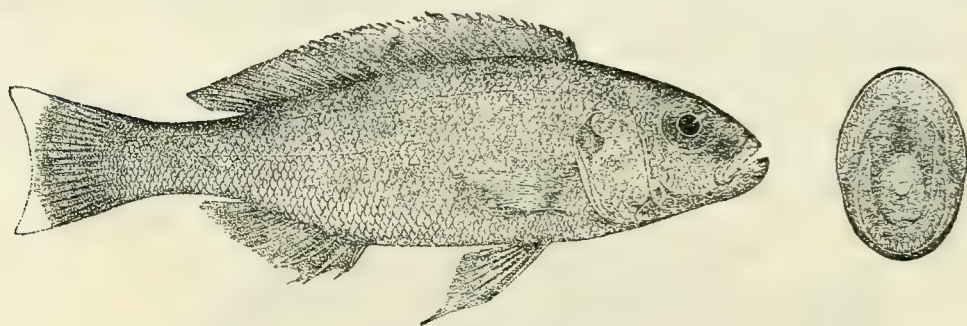
Lake Tanganyika.

## 1. XENOCHROMIS HECQUI.

Bouleng. Il. cc., Ann. pl. xlvii. fig. 3, and Tr. Zool. Soc. xvi. 1901, p. 159;  
Pellegr. l. c.

Depth of body equal to length of head,  $3\frac{1}{5}$  to  $3\frac{1}{2}$  times in total length. Head twice as long as broad; snout broader than long and convex, as long as eye in young, a little longer in adult; eye  $3\frac{1}{2}$  to 4 times in length of head, 1 to  $1\frac{1}{3}$  times in interorbital width; lower jaw projecting a little beyond upper; mouth extending to below anterior border of eye; 34 to 46 teeth in upper jaw, 30 to 40 in lower; interocular region scaly, convex; 4 or 5 series of scales on the cheek. Gill-rakers as long as gill-lamellæ, slender, closely set, 45 to 52 on lower part of anterior arch. Dorsal XVI–XVII 10–11; spines subequal from the seventh,  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Anal III 9–10; second and third spines equal, stronger and a little

Fig. 348.

*Xenochromis hecqui.*

Type (A. M. C.).  $\frac{2}{3}$ .

shorter than dorsals. Pectoral nearly as long as head. Ventral reaching vent or beyond origin of anal. Caudal with deep crescentic notch. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times as long as deep. Scales  $64-67\frac{6}{20}$ ; lateral lines  $\frac{53-60}{35-43}$ ; 4 series of scales between the lateral lines anteriorly. Olive above, whitish beneath, with more or less distinct dark bars across the back on the posterior half of the body; a blackish opercular spot.

Total length 270 millim.

Lake Tanganyika.—Types in Congo Museum, Tervueren.

1-2. Ad.	Usambura.	Prof. J. E. S. Moore (C.).
3. Skel.	"	"
4. Hgr.	Moliro.	Dr. W. A. Cunningham (C.).



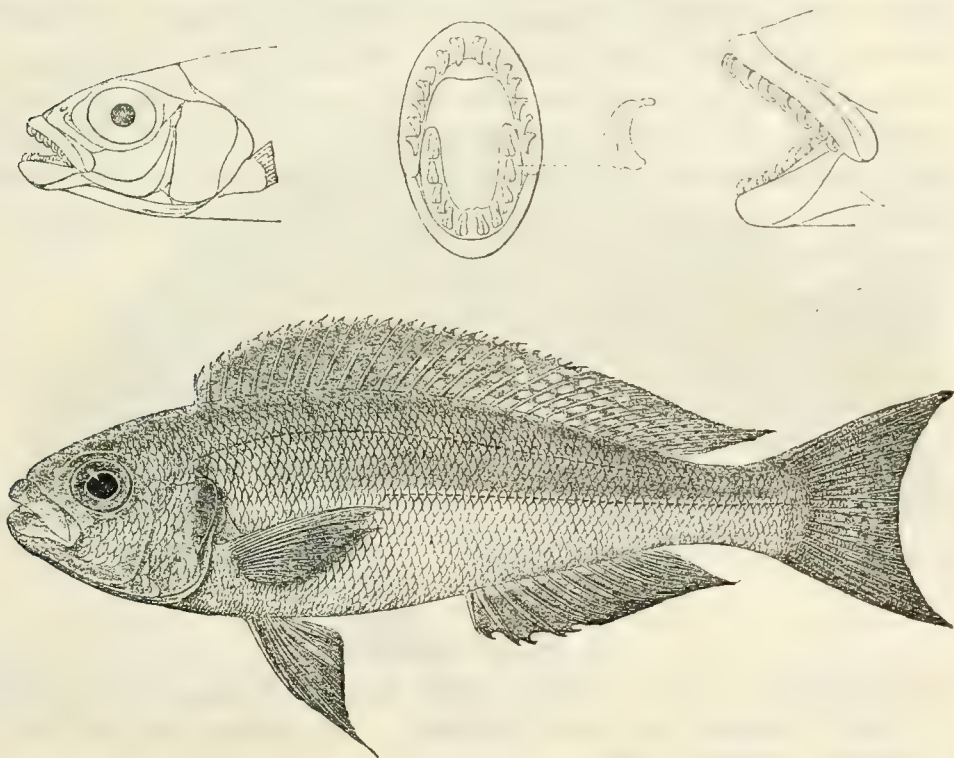
## 40. PLECODUS.

Bouleng. Tr. Zool. Soc. xv. 1898, p. 22, and Poiss. Bass. Congo, p. 488 (1901);  
 Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 362.

Body elongate, covered with small cycloid scales; two lateral lines, the upper nearly complete. Teeth in a single series, large and few, unequal in size, compressed, lamellar and a little concave in front, truncate and strongly curved backwards; maxillary exposed. Dorsal with 18 to 20 spines, anal with 3. Parietal and occipital crests very strong, extending to between the orbits. Vertebrae 38 (18+20).

Lake Tanganyika.

Fig. 349.



*Plecodus paradoxus*.

Niamkolo, 2. Head and dentition of type-specimen, enlarged.

## 1. PLECODUS PARADOXUS.

Bouleng. ll. cc., and Ann. Mus. Congo, Zool. i. p. 152, pl. lii. fig. 4 (1900);

Pellegr. l. c.; Bouleng. Tr. Zool. Soc. xvii. 1906, p. 574.

*Plecodus bimaculatus*, Steind. Anz. Ak. Wien, 1909, p. 426.

Depth of body nearly equal to length of head,  $3\frac{1}{2}$  to 4 times in total length. Head twice as long as broad; snout broader than long and



convex, as long as eye in adult, shorter in young; eye 3 to  $3\frac{1}{2}$  times in length of head, 1 to  $1\frac{1}{3}$  times in interorbital width; jaws strong, lips thick; mouth extending to below anterior fourth of eye; 14 to 20 teeth in upper jaw, 12 to 16 in lower; interocular region scaly, convex; 3 or 4 series of scales on the cheek. 18 to 21 gill-rakers on lower part of anterior arch, the posterior rather elongate. Dorsal XVIII-XX 11-13; spines rather strong, subequal from the eighth or ninth,  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head; longest soft rays  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Anal III 12-13; spines very strong, third  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Pectoral  $\frac{3}{4}$  to  $\frac{4}{5}$  length of head. Ventral not reaching anal. Caudal with deep crescentic notch. Caudal peduncle  $1\frac{2}{3}$  to 2 times as long as deep. Scales 75-78  $\frac{5-6}{18-19}$ ; lateral lines  $\frac{58-66}{44-53}$ ; 5 series of scales between the lateral lines anteriorly. Olive-grey above, shading to whitish below, with 7 or 8 somewhat irregular, yellowish-brown, longitudinal lines; two or three ill-defined dark brown bars across the back and a round blackish spot at the root of the caudal fin sometimes present; a black opercular spot; dorsal and caudal fins brown, with round yellow spots.

Total length 290 millim.

Lake Tanganyika.—Types in Congo Museum, Tervueren.

1-2. Ad.	Niamkolo.	Dr. W. A. Cunningham (C.).
3. Hgr.	Moliro.	"
4. Hgr.	Kasakalawe.	"
5. Skel.	Sumba.	"
6. Yg.	Albertville.	Capt. Hecq (C.).
7. Hgr.	Kilewa Bay.	Dr. L. Stappers (C.).

#### 41. PARETROPLUS.

Bleek. Versl. Ak. Amsterd. ii. 1868, p. 311; Sauv. Hist. Madag., Poiss. p. 445 (1891); Bouleng. Proc. Zool. Soc. 1899, p. 142; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 358.

Body short; scales cycloid; two incomplete lateral lines. Teeth rather large, with blunt crowns, forming a single series; one or two more or less enlarged teeth on each side at the symphysis of either jaw; maxillary exposed. Dorsal with 16 to 20 spines, anal with 8 to 10, both fins with a scaly basal sheath. A scaly process at base of ventral. Occipital and parietal crests strong, extending to between the orbits. Vertebrae 34 (17+17).

Madagascar.

Two species :—

D. XVIII-XX 11-14 ; A. IX-X 9-11 ; Sc. 35-

37  $\frac{5-6}{17}$  . . . . . 1. *P. damii*, Blkr., p. 505.

D. XVI-XVIII 17-18 ; A. VII-IX 13-14 ;

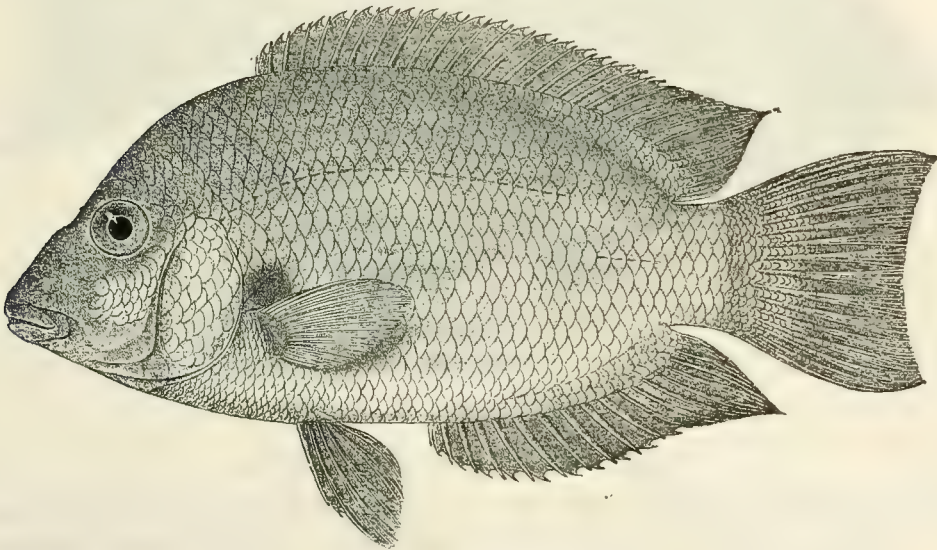
Sc. 32-34  $\frac{4-5}{14-15}$  . . . . . 2. *P. polyactis*, Blkr., p. 506.

1. PARETROPLUS DAMII.

Bleek. t. c. p. 313, and Poiss. Madag. p. 13, pl. iv. fig. 3 (1875); Sauv. op. cit. p. 446, pl. xlv. fig. 1 ; Bouleng. l. c. ; Pellegr. l. c.

Depth of body hardly twice in total length, length of head 3 times. Head twice as long as broad ; snout strongly compressed, twice as long

Fig. 350.



*Paretroplus damii*.

Imerina.  $\frac{2}{3}$ .

as eye in adult ; eye  $4\frac{1}{2}$  times in length of head,  $1\frac{1}{2}$  times in interorbital width ; mouth extending to between nostril and eye ; four series of scales on the cheek, depth of scaly part equal to diameter of eye. Gill-rakers short, 12 on lower part of anterior arch. Dorsal XVIII-XX 11-14 ; last spine longest,  $\frac{2}{3}$  length of head, shorter than soft rays. Anal IX-X 9-11 ; last spine slightly longer than longest dorsal. Pectoral not quite  $\frac{3}{4}$  length of head. Ventral reaching anal. Caudal feebly emarginate. Caudal peduncle twice as deep as long. Scales

35-37  $\frac{5-6}{17}$ ; lateral lines  $\frac{23-26}{4-5}$ , lower not extending to root of caudal. Uniform dark brown; a round blackish spot above the axil; pectoral yellowish.

Total length 170 millim.

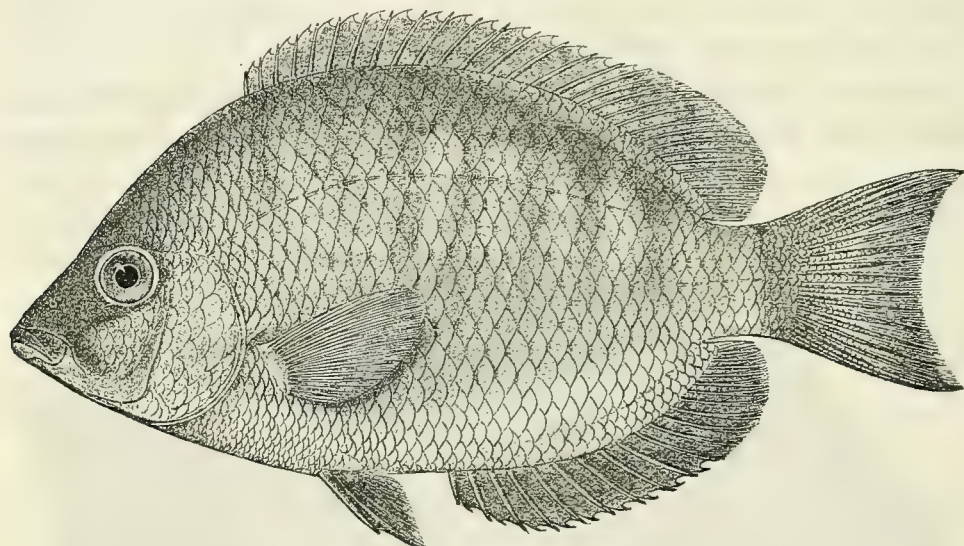
Madagascar.—Type in Leyden Museum.

1. Ad.

Imerina.

Rev. R. Baron (C.).

Fig. 351.



*Paretroplus polyactis.*  
Tamatave.

## 2. PARETROPLUS POLYACTIS.

Bleek. Versl. Ak. Amsterd. xii. 1878, p. 195, pl. iii. fig. 2; Sauv. Hist. Madag., Poiss. p. 446, pls. xlv. A. fig. 7, and xlv. B. fig. 2 (1891); Bouleng. Proc. Zool. Soc. 1899, p. 142; Pellegr. Mém. Soc. Zool. France, xvi. 1904, p. 359.

*Paretroplus damii* (non Bleek.), Steind. Sitzb. Ak. Wien, lxxxii. i. 1880, p. 247.

Depth of body  $1\frac{3}{4}$  to 2 times in total length, length of head 3 times. Head 2 to  $2\frac{1}{4}$  times as long as broad; snout strongly compressed,  $1\frac{1}{2}$  times as long as eye, which is 4 to  $4\frac{1}{4}$  times in length of head and  $1\frac{1}{4}$  to  $1\frac{1}{3}$  times in interorbital width; mouth extending to between nostril and eye; 3 or 4 series of scales on the cheek, depth of scaly part equal to or a little less than diameter of eye. Gill-rakers short, 11 or 12 on lower part of anterior arch. Dorsal XVI-XVIII 17-18; last spine

longest, about  $\frac{2}{5}$  length of head, shorter than soft rays. Anal VIII-IX 13-14; last spine longest, as long as or a little longer than last dorsal. Pectoral not quite  $\frac{3}{4}$  length of head. Ventral reaching anal. Caudal feebly emarginate. Caudal peduncle about  $1\frac{1}{2}$  times as deep as long. Scales 32-34  $\frac{4-5}{14-15}$ ; lateral lines  $\frac{20-22}{9-10}$ . Olive or brown, uniform or with very indistinct darker bars; pectoral yellowish.

Total length 165 millim.

Madagascar.—Type in Leyden Museum.

1-2. Ad.	Tamatave.	Rev. W. D. Cowan (C.).
3. Skel.	”	”
4. Ad.	Imerina.	Rev. R. Baron (C.).





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*adolphi-frederici* (*Tilapia*), 220.  
*ægyptiaca* (*Anguilla*), 5.  
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     „ (*Symbranchus*), 2.  
*affinis* (*Chromis*), 190.  
     „ (*Tilapia*), 190.  
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*alcalica* (*Tilapia*), 188.  
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     „ (*Haplochromis*), 305.  
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     *commersonii*, 112.  
     „     *macracanthus*, 112.  
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     „ (*Tilapia*), 171.  
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     „     *acutirostris*, 5.  
     „     *ægyptiaca*, 5.  
     „     *amblodon*, 9.  
     „     *aneitensis*, 6.  
     „     *australis*, 9

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     „     *callensis*, 5.  
     „     *canariensis*, 5.  
     „     *capensis*, 6.  
     „     *celebensis*, 6.  
     „     *delalandii*, 6.  
     „     *elphinstonei*, 7.  
     „     *hildebrandti*, 8.  
     „     *johannæ*, 7.  
     „     *labiata*, 6, 7.  
     „     *latirostris*, 5.  
     „     *macrophthalma*, 7.  
     „     *mauritiana*, 7.  
     „     *mossambica*, 6.  
     „     *nilotica*, 5.  
     „     *virescens*, 6, 9.  
     „     *vulgaris*, 4.  
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     „ (*Tropheus*), 278.  
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